THE PLANT DISEASE REPORTER

Issued By

THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey

BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station — Beltsville, Maryland
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THE CEREAL RUST SITUATION IN KANSAS

C. O. Johnston

Frequently at this time of year Kansas farmers begin worrying about the danger of rust damage to their crops of wheat and oats, but this year rust seldom is mentioned. There is much talk and publicity about the poor condition of the wheat, late maturity, thin stands, irregularity in development, droughty condition, and the encroachment of weeds. The latter factor is so serious that thousands of acres are bing sprayed with 2,4-D in the western part of the State.

The lack of concern over rust of wheat this year is due to a combination of several factors. The fall of 1946 was an unusually wet one in most of Kansas but especially in western counties. As a consequence there was a rank growth of volunteer and early sown wheat. By mid-October this wheat was very heavily infected with leaf rust and it was feared that the 1947 crop might be heavily rusted. Such did not prove to be the case, however. The rust disappeared during the late winter of 1946-47 and was late in its appearance and development the following spring. The 1947 crop therefore developed with the lightest infections of leaf and stem rust observed in many years. Thus the Kansas bumper crop of 1947 was produced without rust damage.

The factors probably more responsible for the present lack of interest in rust than the absence of rust damage last year, are those centered around the conditions under which this year's crop was sown. The summer of 1947 was exceedingly hot and dry. As a consequence, there was little volunteer wheat and very little early-sown wheat. Germination was irregular in the few early-sown fields and the plants made only limited fall growth. Such wheat remained rust-free throughout the fall in sharp contrast to the heavy leaf rust [Puccinia rubigo-vera var. tritici] infections of the preceding fall. A still more important factor was the extremely late seeding and late emergence of much of the 1948 crop. Owing to drought, it was impossible to prepare the wheat seed beds at the normal time on the enormous acreage. Consequently, much wheat that normally would have been sown in September or early October was not sown until November and some of it not until December. Where emergence occurred before the onset of severe weather the plants remained very small throughout the winter. In many fields emergence barely occurred in the fall or did not occur at all until January or February. Obviously, therefore, there was scant chance for leaf rust infection in the fall of 1947 and almost no overwintering of the rust. The unfavorable growing conditions continued through March and April and at the end of April wheat was unusually short, thin, and poor.

During April and May wheat fields in the vicinity of Manhattan have been examined for the presence of rust at fairly regular intevals but

no rust could be found until May 14 when single pustules of leaf rust were discovered at widely separated points. That is much later than normal for the appearance of leaf rust in the vicinity of Manhattan. At present, natural infections of leaf rust still average less than one pustule per leaf and much of the crop is headed or heading. It seems unlikely, therefore, that heavy infections by leaf rust can develop before harvest in anything except occasional lush lowland fields.

So far, this year, no stem rust [P. graminis] of wheat has been seen or reported in Kansas, and the 1948 wheat crop seems reasonably safe from that hazard, except possibly some of the extremely late fields in western counties.

The 1948 Kansas oat crop was sown under rather unfavorable conditions and there is great variation in its development. Some fields are good but many are poor with the stands thin and the plants small. Thus far no rust of any kind has been seen or reported on oats in Kansas but there is still time for considerable rust to develop on that crop should inoculum become abundant.

DIVISION OF CEREAL CROPS AND DISEASES

DILOPHOSPORA AND NEMATODE DISEASE IN WHEAT IN SOUTH CAROLINA

R. W. Leukel

On July 23, 1946 specimens of wheat heads infected with Dilophospora alopecuri (Fr.) Fr. along with a quantity of threshed wheat infested with wheat nematode [Anguina tritici] galls were received from a farmer in Greenville County, South Carolina. This was reported in the Plant Disease Reporter, (Vol. 30 (9), p. 327, 1946).

On April 19, 1948, specimens of wheat plants badly infected with Dilophospora alopecuri, along with some nematode-infected plants, were received from W. C. Nettles, Extension Leader in Entomology and Plant Pathology, Clemson College, South Carolina. He had collected these plants in Spartanburg County about 40 miles from the infected field found in 1946. The writer visited the field in Spartanburg County on May 12 and estimated a loss of about 20 percent in a large part of the field. No other infected fields were found in the immediate neighborhood; hence, it seems probable that the disease was introduced by means of infested seed from some distance.

The writer also visited the farm in Greenville County on which the disease had been found in 1946. The farmer stated that he had used the

wheat from the infected crop for seed in the fall of 1946. The seed had been well cleaned and then dipped in blue-stone solution. The galls, light kernels and trash had been skimmed off. The farmer reported that he had had no nematode infection in his 1947 crop, and the writer found none in his 1948 crop which was grown from the same lot of seed. Apparently the thorough cleaning of the seed and skimming off the light kernels, galls and trash during the blue-stone treatment in 1946 along with crop rotation had eliminated the nematode disease and with it also the Dilophospora disease, since the latter is dependent on the former for its maintenance.

The wheat nematode disease is known to be present to some extent in seven of the grain growing counties in northwest South Carolina and also in Lexington County. It is not known to what extent it is accompanied by the Dilophospora disease, as only two reports of the latter have been received. It is urged that all nematode-infected wheat fields observed in this area be examined for the presence of Dilophospora and that its occurrence be reported to the Plant Disease Survey. Specimens may be sent to Clemson College, Plant Disease Survey, or to the writer for identification.

DIVISION OF CEREAL CROPS AND DISEASES

SUSCEPTIBILITY OF SOME SPECIES OF TRIFOLIUM, MEDICAGO AND MELILOTUS TO ERYSIPHE POLYGONI

K. W. Kreitlow[1]

During the winter of 1947-48, a number of species of forage legumes growing in a greenhouse became infected with powdery mildew, Erysiphe polygoni DC. Red clover plants heavily infected with mildew were growing in the same house, which suggested that the race or races of E. polygoni parasitizing red clover infected the other host species. Outside contamination seemed unlikely since seed of each species, except Trifolium pratense L., was planted in October and infection was observed only on older plants in midwinter. There was considerable variation in susceptibility among plants of each species represented by at least 10 and in most cases by 30 plants. Production of conidia on leaves was used as a criterion for determining infection. No artificial cross-inoculations were made.

1 Associate Pathologist, U. S. Regional Pasture Research Laboratory, State College, Pennsylvania.

Table 1. Reaction of species of Trifolium, Medicago, and Melilotus to Erysiphe polygoni from red clover.

Host	Author			Severity of Infection*
	Blumer	Yarwood	Kreitlow	
Trifolium pratense L.	+	+	+	4
Trifolium lupinaster L.		+		
Trifolium carolinianum Michx.		+	-	
Trifolium striatum L.		+	+	3
Trifolium reflexum L.		+	-	
Trifolium angustifolium L.		+		
Trifolium panormitanum Presl.		+		
Trifolium hybridum L.	+	+	+	2
Trifolium squarrosum L.		+		
Trifolium resupinatum L.		+	-	
Trifolium subterraneum L.	-	+	-	
Trifolium fragiferum L.	+	+	-	
Trifolium repens L.	-	+	-	
Trifolium incarnatum L.		-	-	
Trifolium alexandrinum L.		-	-	
Trifolium dubium Sibth.	-	-	+	4
Trifolium medium L.	+	-		
Trifolium pannonicum Jacq.	-	-		
Trifolium rubens L.	-	-		
Trifolium procumbens L.	-	-	+	4
Trifolium agrarium L.	-		+	2-3
Trifolium arvense L.	-		-	
Trifolium glomeratum L.			+	1
Trifolium cernuum			+	2
Trifolium hirtum All.			+	1
Trifolium lappaceum L.			-	
Medicago hispida Gaertn.			+	1
Medicago arabica (L.) All.			+	3
Medicago obscura			-	
Medicago lupulina L.			-	
Medicago minima Grufb.			-	
Medicago sativa L.			-	
Melilotus alba Desr.			-	
Melilotus indica (L.) All.			+	1
Melilotus suaveolens Ledeb.			-	
Melilotus officinalis (L.) Lam.			-	

* Severity of infection based on comparison with heavily infected Trifolium pratense, 4 denotes greatest susceptibility.

Several workers investigated the host range of Erysiphe polygoni parasitizing T. pratense, yet, there is some disagreement concerning the capacity of powdery mildew from red clover to infect other species of legumes. Salmon (4), Mains (3) and Hammerlund (2), were unable to infect alsike clover with mildew from red clover; however, Blumer (1) and Yarwood (5) succeeded. In addition, Yarwood (5) infected 13 out of 20 species of Trifolium tested with mildew from red clover. The variability in results reported indicates several factors may be operating: (a) There may be geographic distribution of physiologic races of the organism; (b) Environmental conditions where observations were made may have conditioned infection on some hosts.

Data in Table 1 compare infection tests by Blumer (1) and Yarwood (5) with observations by the author and it is evident that striking differences occur. This is particularly true for the heavy infection recorded on Trifolium dubium Sibth. and T. procumbens L., both of which resisted infection in tests by Blumer (1) and Yarwood (5). Conversely, both Blumer (1) and Yarwood (5) found T. fragiferum L. susceptible to powdery mildew from red clover. In observations here reported, 30 plants of this species grew adjacent to heavily mildewed plants of T. dubium and T. pratense for several months without becoming infected. In addition, 2 out of 6 species of Medicago and 1 out of 4 species of Melilotus became infected with powdery mildew.

Although cross-inoculation tests would have eliminated doubt, it seems reasonably certain that infection on the different host species spread from infected red clover. Variance from previously published data indicates the presence of possibly one or more additional physiologic races.

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4. Salmon, E. S. A monograph of the Erysiphaceae. Mem. Torrey Bot. Club. 9: 1-292, 1900.
5. Yarwood, C. E. Host range and physiologic specialization of red clover powdery mildew, Erysiphe polygoni. Jour. Agr. Res. 52: 659-665. 1936.

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RESULTS OF SEED-TREATMENT TESTS WITH CASTOR BEAN

E. C. Stevenson

Introduction

Shortages of castor oil for industrial purposes during World War II stimulated research on the domestic production of castor beans for oil. Experimental plantings were made in several locations in the United States. Difficulties in getting satisfactory stands were encountered at practically all locations. The poor stands resulted from seedling diseases, which caused poor emergence and reduced seedling vigor.

Seed treatment tests using commercial fungicide dusts were made at Beltsville, Maryland each season from 1943 through 1947 to evaluate seed treatment as a means of increasing stands.

Materials

Four varieties of castor beans and eight commercial fungicides were used in the tests. Not all varieties or fungicides were tested in each year, however. The varieties were Conner, Doughty 11, Kentucky 38, and 227. The seed treatment dusts were:

(1) Arasan (non-wettable 50% tetramethyl thiurandisulfide)
(2) Fermate (70% ferric dimethyl dithiocarbamate)
(3) New Improved Semesan Jr. (1% ethyl mercury phosphate)
(4) Semesan (30% hydroxymercuric chlorophenol)
(5) Spergon (90% tetrachloro parabenzoquinone)
(6) Tersan (wettable 50% tetramethyl thiuramdisulfide)
(7) Ceresan-M (ethyl mercury p toluene sulfonanilide 7.7%, Hg 3.3%)
(8) Dow 9 (50% zinc trichlorophenate)

Experimental Results

In 1943 fungicides 1,3,4,5, and 6 were applied to seed of varieties Conner, Doughty 11, and Kentucky 38 at the maximum dust-holding capacity of the seed. The treated seed was planted with a non-treated control in a split-plot randomized block of five replications. One hundred seeds of each treatment were planted in a 25-foot row of each replication. Comparisons between treatments were made on the basis of seedling emergence. The results of this test are given in Table 1. All seed treatments produced significantly better stands than were obtained from the non-treated control. Tersan and Arasan were significantly more effective than the other fungicides. Arasan and Tersan increased emergence 11 percent; New Improved Semesan Jr., Semesan, and Spergon all increased emergence 8 percent over the control. (The control figures were considered to represent 100 percent emergence.)

Table 1. Percentage of emergence of varieties of castor beans treated with fungicides 1943-1947, inclusive.

FUNGICIDE	1943				1944			1945			1944-1945	1946			1947		
	CONNER	DOUGHTY 11	KENTUCKY 38	ALL VARIETIES	CONNER	DOUGHTY 11	BOTH VARIETIES	CONNER	DOUGHTY 11	BOTH VARIETIES	TWO - YEAR AVERAGES	CONNER	DOUGHTY 11	BOTH VARIETIES	CONNER	227	BOTH VARIETIES
Control	45.9	82.2	78.0	68.7	39.6	53.3	46.5	87.8	12.6	50.2	48.4	74.7	26.5	50.6	71.1	86.3	78.7
ARASAN	53.1	93.3	85.9	77.4**	46.5	78.5	62.5**	90.0	58.6	74.3**	68.4**	79.3	51.7	65.5**	87.8	94.6	91.2**
SPERGON	49.2	90.6	82.9	74.1**	45.9	74.4	60.1**	80.8	35.1	58.0**	59.1**	75.7	38.7	57.2	85.3	91.3	88.3**
N.I.S. Jr.	48.3	91.9	83.4	74.6**													
SEMESAN	50.9	87.8	82.1	73.6**													
TERSAN	51.5	91.1	87.8	76.8**													
FERMATE					38.8	69.5	54.1**	83.5	46.7	65.1**	59.6**						
CERESAN-M												90.0	55.0	72.5**	94.1	92.3	93.2**
DOW 9												78.7	43.3	61.0**	93.9	94.1	94.0**

** Statistically significant at the 5% level when compared with the control.

In 1944 and 1945 fungicides 3 and 4 containing mercury were dropped from the test because the threatened shortage of mercurial compounds during the war made it probable that such fungicides would not be available for treating large lots of seed. The non-mercurial compounds Spergon and Arasan, moreover, were as effective in 1943 as the mercury-containing compounds. Fermate was included, since it also is non-mercurial. The three fungicides (1,2, and 5) were applied to the seed of Conner and Doughty 11, at a rate equivalent to two ounces per bushel. The treated seed and non-treated seed as control were planted in hills spaced 42 X42 inches in a split-plot randomized block of four replications. Data were taken on emergence and seed yield. The results are shown in Table 1. All three fungicides increased emergence significantly in both 1944 and 1945. Emergence was increased 34 percent by Arasan, 27 percent by Spergon, and 14 percent by Fermate in 1944, and 48 percent by Arasan, 16 percent by Spergon, and 30 percent by Fermate in 1945. Seed treatment had no effect on the yield when the stands were comparable. In cases, however, where the stand in the control plots were markedly reduced owing to poor emergence the yields were lower.

Fungicides 1, 5, 7, and 8 were used for the seed treatment tests in 1946 and 1947. These were applied to seed of Conner and Doughty 11 in 1946 and Conner and Number 227 in 1947 at a rate equivalent to two ounces per bushel. The treated seed and non-treated seed as control was planted in hills one foot apart, four seeds per hill, 25 hills to a row in six replications.

With the exception of Spergon, all treatments increased emergence significantly in 1946 as shown in Table 1. Emergence was increased 43 percent by Ceresan M, 29 percent by Arasan, and 21 percent by Dow 9. The results in 1947 had essentially the same trend as those of 1946 except that the use of Spergon also increased the stand significantly. Increases over the non-treated control were 16 percent with Arasan, 12 percent with Spergon, 18 percent with Ceresan M, and 19 percent with Dow 9.

Discussion

Treatment of castor-bean seed with certain dust fungicides proved highly beneficial to emergence. In most cases all of the fungicides tested were beneficial. Arasan, however, has been the most consistant in these tests and has usually given the maximum emergence in any one test. Ceresan M and Dow 9 appear to be very good on the strength of the results obtained in the two years they were used and future testing may show them to be superior to Arasan.

It is estimated that the cost of treating castor-bean seed with dust fungicides would probably be comparable with that of similarly treating corn. Since poor stands are very common in castor bean plantings, the annual use of dust-fungicides for seed treatment would be a wise practice.

Summary

Treatment of castor-bean seed with dust fungicides increased emergence significantly under most conditions. All of the fungicides tested increased the emergence when used at the rate of 2 ounces per bushel, but Arasan, Ceresan M and Dow 9 appeared to be outstanding.

In the two years that yield data were taken it was found that increases in yield from seed treatment resulted only when the differences in stand, as a result of seed treatments were great. No increase in yield occurred as a result of seed treatment when the stands were comparable, indicating the benefit obtained is entirely in assuring a better emergence and that the later growth of the plant is not affected.

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DIPLODIA CANKER ON COTTON

E. M. Hildebrand

In the Texas cotton breeding program much of the selection and hybridization work is carried on in the greenhouses on plants more than one year old. During the past winter some of these woody perennial plants, at between two and three years of age, developed cankers at pruning stubs or wounds that served as infection courts. The infections were progressive, resulting in girdling and death of the plants. Since the affected plants were of value in the breeding program, the writer's attention was called to this trouble and the results of the observations are herewith reported.

Only a relatively small proportion of the cotton plants were affected, in the neighborhood of 5 percent. On two plants in one greenhouse on which observations were made, abundant glistening white spore tendrils were observed exuding from pycnidia located along ridges in the bark. These pycnospores measured about 26.3 by 14.8 microns, were non-septate and almost colorless.

According to W. W. Diehl one would ordinarily consider these fructifications referable to the genus Macrophoma, for which there is no matching description of species. It appears that in many instances Diplodia spores are rather slow and reluctant to form septa and develop pigment, as was pointed out by Voorhees (1942).[1] However, the spore size and

[1] Voorhees, R. K. Life history and taxonomy of the fungus Physalospora rhodina. Florida Agr. Exp. Sta. Bul. 371: 1991. (May) 1942.

structure of pigmentation in this material match the requirements of the species as discussed by Voorhees.

Subsequently on one severely girdled cotton plant in another greenhouse an abundance of immature pycnidia were found on the canker, which was about 10 inches long. Some diseased bark specimens were placed in a petri dish moist chamber and held at room temperature (approximately 25°C). In about 3 days an abundance of dark spore tendrils appeared which contained typical 2-celled Diplodia spores measuring 25.2 by 14.7 microns.

Another instance will be cited of a severe girdling canker which developed at and just below a graft union in association with a large wound overgrowth or callus proliferation at the lower tip of the scion arising from imperfect matching of stock and scion. This girdling canker was about 12 inches long.

Agar cultures were made from both pycnospore collections and from canker tissues. The mycelial growths were identical in some but not all instances, there being a lighter-color mycelial growth induced by the hyaline, non-septate spores which often failed to develop darker color and pycnidia after five weeks. Occasional pycnidia developed in potato-dextrose agar containing typical colored one-septate spores of Diplodia. Therefore, on the basis of these preliminary studies it appears that the fungus encountered in cotton cankers is referable to the conidial stage Physalospora rhodina (Bert. & Curt.) Cke.

Failure to induce sporulation of this fungus in any abundance on culture media recalls a like situation when working with the similar, if not identical, Diplodia natalensis on citrus while in Florida between 1944 and 1946. It was found that the fruit of avocado was an ideal spore producing medium, with the entire surface of wound-inoculated fruit soon being covered with sporulating pycnidia. Moreover, the sporulating stage was easily held in readiness for future use by storage of the fruit in a refrigerator for several months. This fungus commonly induces a stem-end rot disease of avocado in Florida.

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AN OUTBREAK OF DAMPING OFF OF COTTON CAUSED BY RHIZOCTONIA SOLANI

Philip J. Leyendecker

Considerable damage to the cotton stands[1] has occured this season in the Mesilla Valley of New Mexico, extending south to Canutillo and El Paso,

[1] All fields surveyed were planted to Acala 1517 W.R.

Texas. The damping off injury was caused by Rhizoctonia solani Kuehn, which has been isolated and grown in pure culture. The unusually high incidence of damping off this season may be attributed to the below-normal temperatures prevalent throughout the area immediately following planting which, in most cases, was between April 15 and 30. Mean and minimum temperatures from May 1 to 17 for 1947 and 1948 are here included for comparison. It will be noted that lower minimum as well as mean temperatures predominate for the 1948 season.

MAY

	1947			1948	
	Min.	Mean		Min.	Mean
1	40	60	1	34	57
2	37	59	2	41	60
3	36	59	3	46	61
4	43	64	4	44	51
5	39	64	5	37	53
6	52	66	6	35	55
7	42	65	7	31	56
8	44	65	8	40	60
9	41	61	9	38	60
10	38	58	10	43	57
11	34	57	11	31	55
12	42	63	12	42	52
13	49	69	13	29	46
14	61	77	14	38	49
15	45	70	15	34	56
16	44	70	16	46	59
17	58	76	17	32	54

Many germinating seedlings were destroyed before emergence. Seedlings attacked somewhat later emerged but remained in the cotyledon stage until they shriveled and died. Thinning was delayed, yet complete replanting was necessary in a large number of fields, and in others long skips were replanted with hand planters. The virulence of the pathogen was of equal magnitude in light and heavy soils.

Infection was confined to the root system. The so-called typical sore-shin symptom was lacking as the fungus remained localized and did not cause a girdling of the hypocotyl at the ground level. The decayed primary roots of the affected seedlings were of a papery, dry texture and reddish brown in color. The secondary roots were sloughed off and completely disintegrated.

Random counts made in badly damaged fields ranged from 10 to 85 percent infection.

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POWDERY MILDEW ON CUCUMBER IN FLORIDA

G. K. Parris

Weber[1] has reported that powdery mildew, Erysiphe cichoracearum D.C., is of very little importance in Florida, except in late spring and summer, since the outdoor cucumber crop is produced before June 1, but that some trouble has been noted in the winter in greenhouses in the State. It apparently is a fairly common custom with local cucumber growers to dust with sulfur, despite the recorded fact that sulfur injures cucurbits and reduces the yield.[2] When challenged on this point, growers have replied that it gave good control of mildew. When pressed further by asking the question "Which mildew?", in distinguishing powdery mildew from downy mildew, the average grower becomes confused, but will still insist that the "mildew" appears as a white powdery growth, usually circular in outline and most common on the upper surface of the leaf. This closely parallels a description of powdery mildew. Further, the fact that a satisfactory control is obtained from dusting with sulfur indicates that some of the disease in question must be powdery mildew, rather than downy mildew, Pseudoperonospora cubensis (Berk. & Curt.) Rostow, which disease is epiphytotic in Florida, and the growers call "rust".

From February 1945 to the present, the writer has not found or been shown powdery mildew in Central Florida cucumber plantings. He has tried to discourage the use of sulfur dust and growers now use copper-lime, copper compound A, or Parzate, Dithane, and other substitutes for copper, and get fairly good control of downy mildew. They do apply sulfur, however, when they think they have powdery mildew. Today, April 15, specimens of powdery mildew on cucumber were brought to this laboratory, with the fungus fruiting vigorously and causing typical injury. In the field the organism is not doing a great deal of damage and growers are not perturbed.

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1 Weber, G. F. Cucumber diseases in Florida. Fla. Agr. Exp. Sta. Bull. 208. 31-33. 1929.

2 Weber, G. F. Spraying and dusting cucumbers for control of downy mildew from 1925 to 1930. Fla. Agr. Exp. Sta. Bull. 230: 52-53. 1931.

INCIDENCE OF POTATO DISEASES AT HASTINGS, FLORIDA, IN 1948

A. H. Eddins

Late Blight. - Although 9.04 inches of rainfall occurred in March during the middle of the potato-growing period, a disastrous epidemic of late blight (Phytophthora infestans (Mont.) D By.) was prevented by frequent applications of fungicides including dithane-zinc sulfate spray, and tribasic copper sulfate, copper compound A and COC-S dusts. Copper dusts gave good control of blight when the amount used was sufficient to cover each acre of potatoes with 3 to 4 pounds of metallic copper each week when the disease was spreading.

Seed Piece Decay. - Excessive rainfall of 5.08 inches from January 21 to 24 during the middle of the planting period water-logged the soil and much seed was destroyed by soft rot (Erwinia carotovora (Jones) S.A.B.) in several thousand acres. Many fields had to be replanted in February.

Fusarium Rot. - Tuber decay due to Fusarium sambucinum f 6 Wr. & Rg. was present in seed potatoes but was confused mostly to Canadian-grown stocks. Some shipments of seed contained from 5 to 25 percent affected tubers which were thrown out at cutting time.

Corky Ringspot Percentages of tubers affected with corky ringspot on 3 farms in 1948 ranged from a trace to 75 percent in different parts of fields. Several carloads of affected tubers were sold as commercials or were dumped. This disease occurred in the same locality but not on the same farms on which it was first found in 1946.

Brown Rot. - Late planting of the crop and warm weather throughout April favored development of brown rot caused by Bacterium solanacearum E.F.S.

Blackleg. - Tubers affected with blackleg (Erwinia carotovora (Jones) S.A.B.), were seen in scrap barrels at all packinghouses. However, it did not cause excessive losses during the wet season of 1948, probably because most affected seed pieces decayed completely before producing plants with diseased tubers.

Other Diseases. - Ring rot (Corynebacterium sepedonicum (Spieck. & Kotth.) Skapt. & Burk.) was not seen in seed potatoes or in tubers of the new crop. Southern blight (Sclerotium rolfsii Sacc.), common scab (Actinomyces scabies (Thax.) Gussow), rhizoctonia (Rhizoctonia solani Kuehn), sclerotinia rot (Sclerotinia sclerotiorum (Lib.) D By.) and virus diseases were present but caused minor losses.

An estimate of losses caused by all diseases of potatoes at Hastings, Florida, in 1948 is as follows:

Diseases	Loss in Percent
Seed Piece Decay	7
Late Blight	3
Brown Rot	2
Blackleg	1
Fusarium Rot	1
Corky Ringspot	Trace
Others	1
Total	15

POTATO INVESTIGATIONS LABORATORY, HASTINGS, FLORIDA

PROGRESS REPORTS ON LATE BLIGHT, TOBACCO BLUE MOLD, AND CUCURBIT DOWNY MILDEW

(Summarized from reports of Key Pathologists of the Crop Plant Disease Forecasting Service received up to June 18).

LATE BLIGHT (*Phytophthora infestans*) ON TOMATO

Since the preceding summary, infection of southern-grown plants has been reported from a number of States including, besides VIRGINIA already mentioned, KENTUCKY, MARYLAND, MISSISSIPPI, NEW JERSEY, NEW YORK, OHIO, and TENNESSEE. Losses of 50 percent of the plants were reported and in some cases more was anticipated. On the other hand, plants from the same regions, observed in ILLINOIS and MISSOURI, were in very good condition with no sign of late blight infection. In PENNSYLVANIA no late blight was found on southern plants set out in the field. Possible reasons for the discrepancy between the widely observed infection in places to which the plants were shipped and the absence of recognizable late blight in the region in which they originated include: The plants showing infection were mostly shipped during a short period, which suggests that favorable infection conditions at the point of origin may have been of brief duration. In contrast, the plants were set out under favorable weather conditions. The stem canker at ground level reported as the symptom most commonly manifested by the infected plants is not typical for late blight and might have been diagnosed incorrectly, or overlooked in the fields. The size of the plant fields, frequently from 50 to 100 acres, does not permit examination of every plant. Transit conditions often favor rapid development of the disease.

By the middle of June tomato late blight had become very prevalent and serious on the MARYLAND Eastern Shore, where it was first observed June 3, the earliest date on record, on southern-grown transplants. In many cases large stem cankers were causing breaking over of entire plants or of main branches. Fruit rot was very prevalent, all of the fruits being infected in some fields. Fixed copper dust applied by airplanes was not very successful in controlling the disease. Favorable weather for late blight prevailed in the rest of the Delmarva Peninsula also. In DELAWARE the disease on tomatoes was found in three fields in Kent and Sussex County during surveys June 11 and 12; in a similar survey a week earlier none was observed.

The disease had become epidemic in the Charleston and Beaufort County tomato-growing area in SOUTH CAROLINA, being serious even in some dusted plantings, although most well-treated fields were not severely affected.

Scattered occurrence on tomato in three eastern NORTH CAROLINA counties was observed during the first part of June.

Outbreaks in the fields in the MISSISSIPPI tomato growing area in Copiah County, originating with infection from important transplants, were checked by a period of dry weather. Loss was expected to be light generally, although plant loss reached 50 percent in some cases.

LATE BLIGHT ON POTATO

By the end of May late blight was general in the Charleston County, SOUTH CAROLINA, area. Amount varied from complete killing of the fields to little or no damage, especially on Sebago. Harvest was under way and yields probably would not be seriously reduced.

In NORTH CAROLINA the disease was observed May 16 in a sprinkler-irrigated field. The owner had had similar experience last year and immediately stopped irrigation and started spraying with Bordeaux. A general outbreak developed by May 22 in the eastern part of the State. Weather was continously favorable.

Favorable weather prevailed also in the Norfolk area of VIRGINIA. In Northampton County on the Eastern Shore late blight was found in an Irish Cobbler field on May 25. The field was adjacent to Rutgers tomatoes from southern-grown plants and indications were that the disease had spread to the potato plants from the tomato field. By the end of May scattered infections were noted throughout the Norfolk area, mostly where air drainage was poor.

On the MARYLAND Eastern Shore, infection generally distributed on two farms in potato fields from home-grown seed was observed June 3 in Worcester County. By June 18 the disease was found in every field examined in Worcester, Somerset, and Wicomico Counties.

Late blight presumably originating from diseased seed was reported in two Kent County, DELAWARE, potato fields June 4. A week late primary infection was observed to be general in eastern and scattered in western Sussex County, and considerable spread was noted in the two Kent County fields. Weather was ideal for late blight.

One infected potato field in Pike County, KENTUCKY, was reported May 18.

In NEW YORK, on Long Island, the disease was observed in one field in Suffolk County during the first week in June. By the middle of the month it was found in four fields in various sections of the County, in all cases restricted to small areas, usually sunken parts, in the field.

POTATO LATE BLIGHT IN BRITISH COLUMBIA

I. L. Conners has sent the following report of early appearance of the disease in British Columbia, which is not included in the Warning Service area:

"We report the occurrence of potato late blight in British Columbia. Potato foliage, affected by late blight, was brought to the office of H. S. MacLeod, District Potato Inspector, Vancouver, on May 28 by a grower at Ladner. The diseased leaves were from the grower's crop of Early Epicure from an area in the field where refuse from last year's potato crop had been left. This record is believed to be the earliest report of late blight in British Columbia."

TOBACCO BLUE MOLD (Peronospora tabacina)

Between May 17 and May 21 blue mold had appeared in ONTARIO, MASSACHUSETTS, CONNECTICUT, and PENNSYLVANIA, in addition to other areas previously reported. No serious shortage of plants due to the disease was reported from any section. The disease was said to be more severe than usual in the Burley area in Southwestern VIRGINIA, even where there was little rainfall. Dews apparently were sufficient for its spread. In spite of favorable weather in CONNECTICUT and MASSACHUSETTS, little blue mold occurred, owing to the general use of Fermate. Besides Fermate, Parzate was used to some extent in VIRGINIA, and Dithane Z-78 in NORTH CAROLINA, with good results.

The disease caused damage to almost mature tobacco in fields in several eastern NORTH CAROLINA counties, during a two- and a half-week period of cool rainy weather.

DOWNY MILDEW (Pseudoperonospora cubensis) OF CUCURBIT CROPS

Watermelons in the Leesburg area of FLORIDA were appreciably affected during the latter half of May. Although weather was dry, dew was adequate for infection.

General light infection was found in 9 of 11 cucumber fields examined in Plaquemines Parish, LOUISIANA, May 10. It had probably been present not more than ten or fifteen days.

Earlier reports of infection in SOUTH CAROLINA were not confirmed, but the disease was definitely found in Charleston County May 31, in abundance on cucumbers. It had obviously been present for several days. Later it was found at another location, and by the middle of June it was generally distributed in Beaufort, Colleton, and Charleston Counties, and was very severe in Beaufort and Charleston.

Downy mildew was first observed in cucumbers in NORTH CAROLINA on June 8 in Scotland County. By the middle of the month is was general in the south-central portion of the eastern part of the State.

OBSERVATIONS ON PEACH BACTERIAL SPOT IN ILLINOIS IN 1948

H. H. Thornberry, H. W. Anderson and Dwight Powell

Since the discovery of spring cankers of bacterial spot of peach, (Xanthomonas pruni) on peach twigs March 22, 1930 (3), annual inspections of peach trees have been conducted in the early spring to determine the time that these infections develop into recognizable lesions (4). This year the first blistery lesions were found on peach twigs at Olney, Illinois (Richland County) on April 9. At this time the lesions were barely visible and none were sufficiently developed to rupture the epidermis and allow the bacteria to spread.

On April 17 another inspection of peach trees at Olney, Illinois, revealed an abundance of spring cankers in the tissues at the base of buds, between the buds as far as six to eight inches from the tip, and at the tip. In some cases, bacterial blistery lesions extended below the area of dead tissues of terminal die-back. At this time most of the blistery lesions had not ruptured. Foliage infection was not observed until May 5 at Olney, Illinois. These infections were centered about spring cankers and no other foliage infections were observed.

In addition to the lesions on peach twigs, some spring canker infections were found on apricots and also on peach nursery seedlings which had been budded but not cut back. This is the first record in Illinois of spring cankers on apricots and nursery seedling peaches. The nursery was adjacent to apricot trees which had heavy foliage infection the previous season.

Five- to eight-year old trees of Chinese seedlings that were extremely

susceptible as young trees (1,2) also had numerous spring cankers. In fact these trees could be identified in an experimental orchard by the numerous spring cankers on the twigs in contrast to the amount on Elberta or other varieties and selections.

Overwintering cankers on apricot twigs (lesions that developed on the green shoots during the previous growing season) contained viable cells of Xanthomonas pruni. The bacteria were restricted to small pockets under the bark at the margin of the lesions. The number of bacteria in these pockets of an overwintering lesion was small in comparison to the number in spring cankers on apricots or peaches. Viable bacteria have been found in similar pockets of overwintering cankers on certain plums but they have not been obtained from similar peach cankers. The apricot and plum tissues do not effectively wall off the bacteria whereas in peach tissues the invasion is stopped and the bacteria do not survive until spring.

Young twigs of the growth from the stock that had been used for some Henderson apricots were found to be very heavily infected with spring cankers. The stock was verified to be Prunus cerasifera (Myrobalan plum)[1]. The Myrobalan plum and Chinese seedling peach are the most susceptible hosts for the development of spring cankers that have been observed to date.

Isolations from the overwintering cankers on apricot and the spring cankers on Myrobalan plum gave typical cultures of X. pruni that produced typical lesions when inoculated into green shoots of peach.

At Urbana, Illinois, the first spring cankers on peach were found on May 8 and the first foliage infection on May 21.

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UNIVERSITY OF ILLINOIS, URBANA, ILLINOIS.

[1] Letter April 22, 1948 from H. L. King, New York Fruit Testing Association from whom the apricots were obtained in 1945.

PEACH RUST (TRANZSCHELIA PRUNI-SPINOSAE) PARASITIZED BY DARLUCA FILUM

E. M. Hildebrand

During the first week of April 1948 specimens were examined of a leaf spot, defoliation condition which had developed on peach trees in the A. and M. College orchard at College Station, Texas. The spots were very numerous on the early first formed leaves and resulted in premature shriveling and dropping of the leaves. The causal agent was identified as Tranzschelia pruni-spinosae (Pers.) Diet., which commonly causes a rust disease of plums and peaches in Texas and elsewhere, starting about midseason and becoming more prevalent as the season advances. This outbreak was somewhat unusual in that the rust was observed on peach very early in the season during the first week of April with the smallest, earliest opened leaves principally infected.

In making microscopic examination it was noted that many of the sori contained an abundance of pycnidia. These pycnidia were in various stages of development and were interfering with the development of spores in the rust sori. These fruiting structures were relatively smooth and where the conidia had matured, they had one or more bristles answering to the description of Darluca filum Cast., an imperfect fungus which along with Tuberculina spp. has been reported many times as being parasitic on the rust fungi.

According to McAlpine (1906) Darluca filum was found on the uredosori of Puccinia pruni Pers. on leaves, stems, and fruits of peach in Australia. The exact time of greatest occurrence was not specified although the rust was common between November and June. In two earlier references (Cobb, 1897; Cornu, 1883) Darluca filum is mentioned as occurring on peach rust. Dr. W. W. Diehl in correspondence states that in the U. S. Department of Agriculture Collections there are two specimens: Auburn, Alabama, 1907, W. A. Orton; Edisto Island, South Carolina, 1899, W. A. Orton. This report seems to be the only one on the occurrence of Darluca filum on peach in Texas and, for that matter, elsewhere in this country in recent years. Specimens for sectioning were sent to Triarch Botanical Products at Ripon, Wisconsin, and for preservation to the U. S. Department of Agriculture herbarium in Washington, D. C.

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STUDIES ON THE CAUSE OF STRAWBERRY ROOT ROT IN OREGON: SECOND REPORT OF PROGRESS[1]

P. W. Miller[2]

In investigations carried on in 1945-1946 (2) it was shown that no one specific fungus is alone associated with the development of lesions on the roots of strawberries in Oregon, but rather that different fungi are involved. The fungi most commonly found associated with root lesions of strawberries in Oregon in 1945-1946 were Ramularia spp., Rhizoctonia spp., Fusarium spp., Chaetomium spp., Phycomycetous fungi (Phytophthora spp. and Pythium spp.) Verticillium spp., Oothecium spp., and Pestalotia spp. Other fungi occasionally isolated were Phoma spp., Coniothyrium spp., Rhizopus spp., Stemphylium spp., Dicoccum spp., Isaria spp., Botrytis spp., Gloeosporium spp., Alternaria spp., Cladosporium spp., Aspergillus spp., Mucor spp., Mycogone spp., Hormodendron spp., and Septoria spp.

Further investigations on the causes of strawberry root rots were carried on in 1947 and 1948 in cooperation with the Oregon Agricultural Experiment Station. Investigations in these two years were concerned primarily with (a) further isolations from lesions on the roots of plants collected from a number of different plantings in widely scattered localities in western Oregon, (b) pathogenicity tests of the organisms isolated, and (c) studies of the relation of desiccation to the development of strawberry root rot.

Isolation Studies

Methods

Root pieces containing definite lesions bordered by turgid, healthy tissues were surface-sterilized in a 0.5% solution of sodium hypochlorite for about 5 minutes and then transferred directly to plates of Difco potato -dextrose agar (pH 5.6).

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[1] Published as Technical paper No. 532 with the approval of the Director of the Oregon Agricultural Experiment Station. Contribution of the Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, United States Department of Agriculture, in cooperation with the Oregon Agricultural Experiment Station.

[2] Plant Pathologist, Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, United States Department of Agriculture.

Table 1. Fungi isolated from lesions on the roots of strawberry plants[a] in western Oregon in 1947 and 1948, and the comparative frequency of their occurrence.

Fungi Isolated	Year and place where plants were grown	Treatments of plants before isolations were made	Part of host from which isolations were made	Total number of lesions from which isolations were made	Percentage of lesions from which fungus in question was isolated
Fusarium spp.	1947; field[b]	freshly dug	roots	544	15.8
Chaetomium spp.	..do..	..do..	..do..	..do..	10.3
Penicillium spp.	..do..	..do..	..do..	..do..	8.8
Ramularia spp.	..do..	..do..	..do..	..do..	8.3
Rhizoctonia spp.	..do..	..do..	..do..	..do..	4.0
Pestalotia spp.	..do..	..do..	..do..	..do..	3.5
Mucor spp.	..do..	..do..	..do..	..do..	3.1
Oothecium spp.	..do..	..do..	..do..	..do..	2.8
Stemphylium spp.	..do..	..do..	..do..	..do..	1.8
Coniothyrium spp.	..do..	..do..	..do..	..do..	1.5
Alternaria spp.	..do..	..do..	..do..	..do..	0.9
Phycomycetes[c]	..do..	..do..	..do..	..do..	0.7
Phoma spp.	..do..	..do..	..do..	..do..	0.7
Nematodes	..do..	..do..	..do..	..do..	0.7
Rhizopus sp.	..do..	..do..	..do..	..do..	0.2
Aspergillus sp.	..do..	..do..	..do..	..do..	0.2
Mycogone sp.	..do..	..do..	..do..	..do..	0.2
Undetermined miscellany	..do..	..do..	..do..	..do..	24.9
Mucor spp.	1947; field[b]	in storage[d]	roots	224	42.0
Fusarium spp.	..do..	..do..	..do..	..do..	14.7
Pestalotia spp.	..do..	..do..	..do..	..do..	14.7
Stemphylium spp.	..do..	..do..	..do..	..do..	13.0
Penicillium spp.	..do..	..do..	..do..	..do..	7.6
Chaetomium spp.	..do..	..do..	..do..	..do..	5.4
Alternaria spp.	..do..	..do..	..do..	..do..	2.7
Cladosporium spp.	..do..	..do..	..do..	..do..	1.8
Coniothyrium spp.	..do..	..do..	..do..	..do..	1.3
Phoma spp.	..do..	..do..	..do..	..do..	1.3
Ramularia spp.	..do..	..do..	..do..	..do..	0.9
Rhizoctonia sp.	..do..	..do..	..do..	..do..	0.4
Undetermined miscellany	..do..	..do..	..do..	..do..	21.4

Table 1. (Concluded)

Fungi isolated	Year and place where plants were grown	Treatments of plants before isolations were made	Part of host from which isolations were made	Total number of lesions from which isolations were made	Percentage of lesions from which fungus in question was isolated
Ramularia spp.	1947; greenhouse[e]	freshly dug	roots	215	50.2
Chaetomium spp.	..do..	..do..	..do..	..do..	8.4
Phycomycetes spp.[c]	..do..	..do..	..do..	..do..	7.9
Rhizoctonia spp.	..do..	..do..	..do..	..do..	4.7
Fusarium spp.	..do..	..do..	..do..	..do..	4.2
Mucor spp.	..do..	..do..	..do..	..do..	3.3
Penicillium spp.	..do..	..do..	..do..	..do..	2.3
Cladosporium spp.	..do..	..do..	..do..	..do..	1.9
Pestalotia sp.	..do..	..do..	..do..	..do..	0.5
Phoma sp.	..do..	..do..	..do..	..do..	14.9
Ramularia spp.	1948; greenhouse[e]	freshly dug	roots	556	23.0
Phycomycetes[c]	..do..	..do..	..do..	..do..	4.1
Fusarium spp.	..do..	..do..	..do..	..do..	2.2
Penicillium spp.	..do..	..do..	..do..	..do..	1.6
Chaetomium spp.	..do..	..do..	..do..	..do..	1.3
Rhizoctonia spp.	..do..	..do..	..do..	..do..	0.7
Pestalotia sp.	..do..	..do..	..do..	..do..	0.2
Undetermined miscellany	..do..	..do..	..do..	..do..	17.9

[a] Marshall, Brightmore, and Redheart varieties and miscellaneous Oregon hybrids.
[b] From 14 widely scattered plantings in western Oregon.
[c] Phytophthora spp. and Pythium spp.
[d] For 1 to 2 months.
[e] Plants grown in field (Corvallis, Oregon) soil in greenhouse bench.

Table 2. The comparative frequency of the occurrence of various fungi isolated from root lesions on strawberries[a] in western Oregon, 1947.

Fungus	Number of times indicated fungus headed list of organisms isolated	Number of times indicated fungus was second highest on list of organisms isolated
Fusarium spp.	9	0
Ramularia spp.	4	4
Chaetomium spp.	2	4
Rhizoctonia spp.	0	2
Alternaria spp.	0	1
Oothecium spp.	0	1

[a] Plants came from 15 widely scattered fields in the Willamette Valley in western Oregon.

Results

Isolations made from 544 root lesions from field-grown plants yielded representatives of 16 identified genera of fungi and other unidentified genera.

Isolations from 771 root lesions from greenhouse-grown plants (in field soil in greenhouse bench) yielded representatives of 10 identified genera of fungi and other unidentified genera.

In Tables 1 and 2 are given the identified fungus genera isolated and the comparative frequency of their occurrence.

Discussion of results of isolations. As was the case in studies carried on in 1945 and 1946 no one specific fungus was alone associated with root lesions on strawberries but a number of different organisms were found to be present. While there was a difference in the kinds of fungi occurring in the lesions when the plants were grown under different soil conditions, essentially the same group of fungi was almost always found to be present. In this group were the following fungi: Fusarium spp., Ramularia spp., Rhizoctonia spp., and Pestalotia spp. The three most prevalent fungi in the order of their frequency of occurrence were Fusarium spp., Ramularia spp., and Chaetomium spp.(see table 2). Other fungi occasionally isolated were Phoma spp., Coniothyrium spp., Rhizopus spp., Stemphylium spp., Cladosporium spp., Mycogone spp., Verticillium spp., Aspergillus sp., and Alternaria spp.

It will be noted from the data given in Table 1 that a marked increase in the incidence of molds, particularly Mucor spp., occurred in lesions on stored plants. In all probability this fungus gained access to already established root lesions while the plants were in storage and should therefore be considered more as a saprophyte than as a parasite.

Pathogenicity Studies

The pathogenicity of representatives of all of the more important identified genera isolated was tested under greenhouse conditions.

In most cases the roots of healthy strawberry plants were dipped in spore suspensions of the fungus in question before planting. Spore suspensions were also poured in the sterilized soil around the crowns after planting, thereby building up a very high "inoculum-potential" in the soil.

In those cases in which the fungus did not fruit in culture it was grown on sterilized sweetclover stems in test tubes at room temperature for one or two months, after which the inoculated stems were pushed into the soil alongside the crowns of healthy plants growing in pots of sterilized soil.

Most of the inoculated plants were incubated in the greenhouse at temperatures ranging from 60° to 70° F. In a number of series, however, the plants were incubated at a higher soil temperature, ranging from 75° to 80° F.

After about two months the roots of the inoculated plants were washed out and examined for the presence of lesions. Re-isolations were made from lesions on a representative number of inoculated plants to check upon the identity of any organisms that may be present.

Under these conditions, a number of different fungi were found capable of infecting the roots and producing lesions. The fungi that proved most pathogenic under these conditions were Rhizoctonia spp., Fusarium spp., and Ramularia spp. Other feebly or less pathogenic fungi were Stemphylium spp., Verticillium spp., and Pestalotia spp.

Despite the apparent parasitism of these organisms under these conditions, it is significant that they generally produced only a few root lesions per plant even though a very high "inoculum-potential" existed around the roots in the soil. This would indicate that the fungi per se are not aggressively parasitic under these conditions and that the soil environment in which the plants are grown plays an important role in the development of severe root rot.

Table 3. Studies on the relation of desiccation to the development of black root rot of strawberries, Corvallis, Oregon, 1947-1948.

Lot number	Number of plants	Number of hours roots were air-dried	Desiccation conditions: General atmospheric conditions	Desiccation conditions: Average temperature	Desiccation conditions: Average humidity	Percent of plants with healthy roots	Percent of plants with indicated relative amounts of root system affected with black-root: 1/4 or less	1/4-3/4	3/4-7/8	7/8 or more
				Degrees F	Percent					
1	10	0	....	....	....	100	0	0	0	0
2	3	1/2-3/4	sunshine	49°-62°	30-66	33.3	66.6	0	0	0
3	5	1-1/2	sunshine	48 -68	43-82	0	80	20	0	0
4	8	2	cloudy	39-54	94-98	12.5	75	12.5	0	0
5	3	2	cloudy	54-57	68-82	0	66.6	33.3	0	0
6	2	2	sunshine	53-58	29	0	0	100	0	0
7	9	2	sunshine	50-72	48-78	0	55.5	44.4	0	0
8	4	3	cloudy	44-57	87-97	0	50	50	0	0
9	4	3-3 1/2	sunshine	50-60	35-72	0	20	60	0	20
10	6	4-4 1/2	cloudy	49-70	58-90	0	66.6	16.6	16.6	0
11	3	4-4 1/2	sunshine	51-60	24-55	0	0	0	66.6	33.3
12	7	5	cloudy	53-83	57-82	0	28.5	71.5	0	0
13	2	5	cloudy	45-49	94-97	0	100	0	0	0
14	10	5	sunshine	51-64	53-73	0	0	50	50	0
15	7	5 1/2-6	cloudy	68-77	51-75	0	0	100	0	0
16	4	6-6 1/2	sunshine	44-66	52-91	0	25	25	50	0
17	10	7	sunshine	42-60	64-90	0	30	40	30	0
18	12	7-7 1/2	cloudy	46-75	64-98	0	50	33.3	16.6	0
19	2	8	sunshine	50-56	60-68	0	0	50	50	0
20	10	8	cloudy	46-78	55-91	0	50	40	10	0

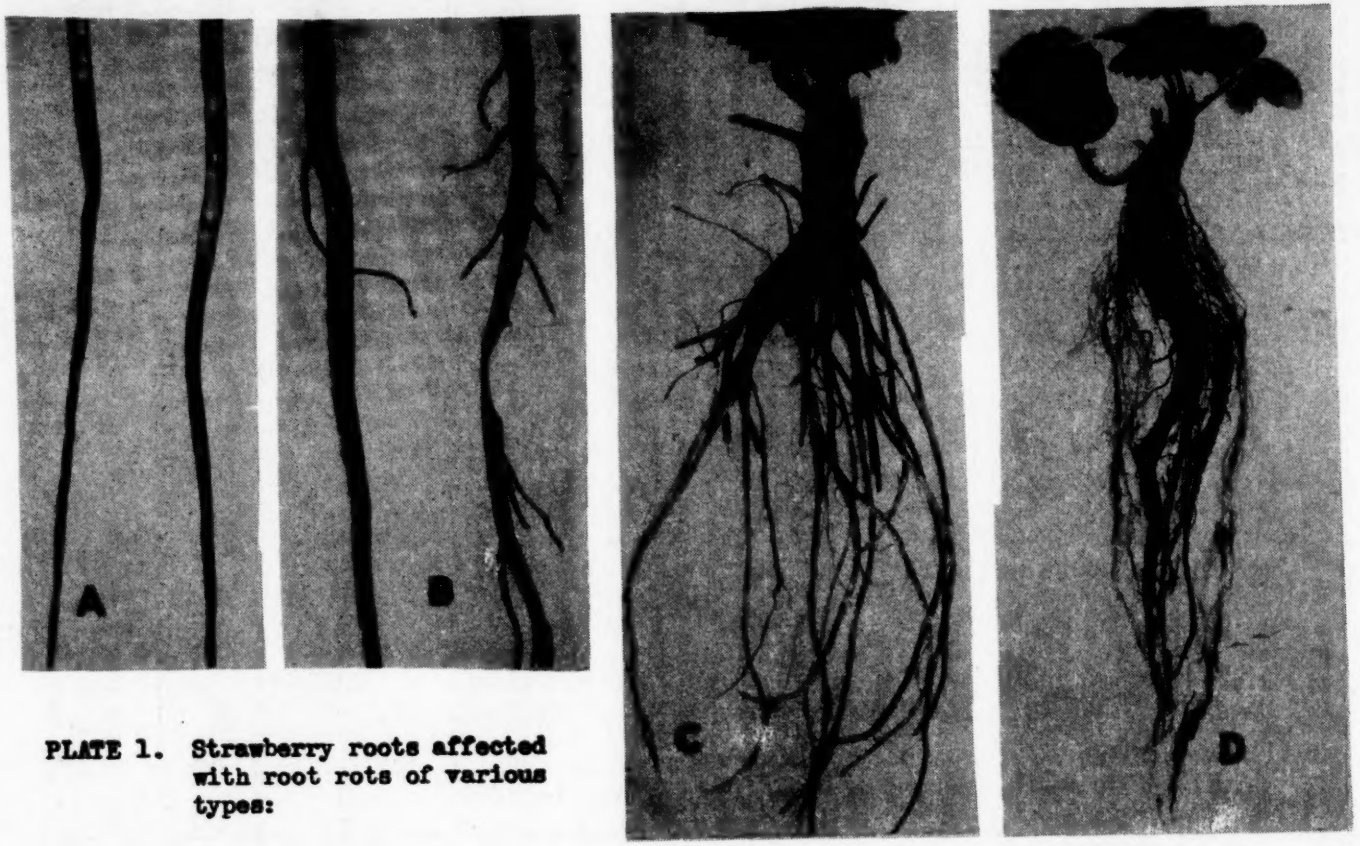

PLATE 1. Strawberry roots affected with root rots of various types:

A, B—Roots infected with the red-stele disease due to Phytophthora fragariae (after Bain and Demaree, Jour. Agric. Res. 70 p. 13. 1945).
C—Brown root rot due to combined action of fungi and adverse soil environment.
D—Black root rot due to air-drying of the roots for 1 hour (84°F., 41% humidity).

Relation of Desiccation to the Development of Black Root rot of Strawberries

Investigations on the relation of desiccation to the development of strawberry root rot conclusively show that a drying-out of the roots during the digging and transplanting processes will result in the development of a black root rot. Black roots were experimentally produced at will by exposing the roots to the air for certain periods (see Plate 1,D). In Table 3 are summarized the results of limited investigations on the relation of desiccation to the development of black roots of strawberries. As is shown by the data given in this table, black roots were produced by exposure of the roots to the air for certain periods. The higher the temperature and the lower the humidity the shorter was the period required to produce black roots. As little as one hour of desiccation produced black roots when they were air-dried in the sunlight at 30 percent or less humidity.

Discussion and Conclusions

From the foregoing it is evident that, under Oregon conditions, strawberry root rot is not due to a single causal factor but to several agencies.

In addition to the widely distributed and well-established red stele disease due to Phytophthora fragariae (1) (Plate 1,A,B), there are two well-defined types of cortical root rots. One of these is what we choose to call "brown root rot", typically producing local, dark-brown lesions in the cortex (Plate 1,C); the other is what we are calling "black root rot", involving much more of the cortex, the affected areas generally turning black instead of brown (Plate 1,D).

Brown root rot is evidently due to the combined action of certain weakly parasitic fungi and adverse soil conditions while black root rot is apparently primarily induced by the desiccation of the roots during the digging and planting processes, and may possibly also be induced by drying under summer drought conditions.

Summary

No one specific fungus was alone associated with root lesions on strawberries in Oregon but a number of different organisms were found to be present. While there was a difference in the fungi occurring in the lesions when the plants were grown under different soil conditions, essentially the same group of fungi was almost always found to be present. In this group were the following fungi: Fusarium spp., Ramularia spp., Rhizoctonia spp., Chaetomium spp., Penicillium spp., Phycomycetes, Mucor spp., Oothecium spp., and Pestalotia spp. The three most prevalent fungi in order of their frequency of occurrence were Fusarium spp., Ramularia spp., and Chaetomium spp. Other fungi occasionally isolated were Phoma spp., Coniothyrium spp., Rhizopus spp., Stemphylium spp., Cladosporium

spp., Mycogone spp., Verticillium spp., Aspergillus sp., and Alternaria spp.

A number of different organisms apparently functioning as weak parasites were found capable of infecting the roots and producing lesions under greenhouse conditions. The fungi that proved most pathogenic under these conditions were Rhizoctonia spp., Fusarium spp., and Ramularia spp., Other feebly pathogenic fungi were Stemphylium spp., Verticillium spp. and Pestalotia spp.

Desiccation of the roots during the digging and transplanting processes will produce a black root condition. Black roots were experimentally produced at will by exposing the roots to the air for certain periods. The higher the temperature and the lower the humidity the shorter was the period required to produce black roots. As little as one hour of desiccation produced black roots when they were air-dried in the sunlight at 30 percent or less humidity.

Literature Cited

1. Bain, H. F., and J. B. Demaree. Red stele root disease of the strawberry caused by Phytophthora fragariae. Jour. Agric. Res. 70: 11-30. 1945.
2. Miller, P. W. Fungi associated with root lesions of the strawberry in Oregon. U. S. Department of Agriculture Plant Disease Reporter 31: 90-99. 1947.

OREGON AGRICULTURAL EXPERIMENT STATION, CORVALLIS.

PLANT DISEASES NEWLY DISCOVERED IN VARIOUS LOCATIONS

DUTCH ELM DISEASE IN COLORADO

W. D. Thomas, Jr., George M. List, Merle E. Michaelson, W. D. Buchanan

The Dutch elm disease has been found recently in Denver, Colorado. In the early part of January, 1948, Mr. John Swingle, a Denver tree surgeon, reported evidence of the disease and its carrier, Scolytus multistriatus. The presence of the insect was verified about that time by W. D. Buchanan, and samples from infected trees were sent to the Dutch Elm Disease Laboratory, East Orange, N. J. for verification of the presence of Ceratostomella ulmi in the wood.

On March 12 the presence of the disease was observed by the senior author. The Dutch Elm Disease Laboratory reported the isolation of the fungus from several specimens sent to them. Therefore on April 7 and 8 personnel from the Bureau of Entomology and Plant Quarantine, the Colorado Agricultural Experiment Station, and Denver Park officials scouted the City of Denver and nearby municipalities. Dutch elm disease was found in several areas of Denver. Evidence of Scolytus infestation was observed in nearby communities of Arvada, Lafayette, Boulder, Longmont, and Greeley.

The origin of this disease in Colorado is purely speculative; but some infections in Denver may have been present for some time. No concentrated effort has been made yet to eliminate infected trees; however, Denver nurserymen are attempting to control the beetle population by spraying with DDT.

COLORADO A & M COLLEGE, FORT COLLINS, COLORADO

CAMELLIA FLOWER BLIGHT IN THE SOUTH

D. L. Gill

Since January 1946 camellia flowers in the Mobile, Alabama, area have been searched for camellia flower blight. This disease, caused by Sclerotinia camelliae Hara, has been found in California and Japan[1,2] but thus far not in the Mobile area. A Botrytis of the Botrytis cinerea type and a species of Penicillium have been associated with some spots found on these flowers here.

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[1] Hansen, H.N., and Thomas, H. Earl. Flower blight of camellias. Phytopath. 30: 166-170. 1940.

[2] Thomas, H. Earl, and Hansen, H.N. Camellia flower blight. Phytopath. 36: 380-381. 1946

Camellia growers have frequently stated since 1946 that the sclerotinia disease was present in a private garden in Georgia. So far as is known no plant pathologist or mycologist had observed the disease in this garden. Specimens of flowers from this garden were received March 3, and apothecia on March 13, 1948. This garden was visited on March 21 by S. L. Emsweller, W. D. McClellan, and the writer. The disease was found in three widely separated greenhouses as well as on plants growing in the open. Sclerotinia and apothecia were also found.

The symptoms observed on the flowers agree with those described by Hansen and Thomas[1]. Likewise the sclerotia and apothecia agree with their description, as does the growth in culture of the fungus isolated from the diseased flowers.

The owner of the garden has bought plants from California for several years and it is probable that the disease was brought into Georgia with these.

To judge from the damage done in this garden, the disease, if it should become widespread in the South, would greatly mar the ornamental value of this popular plant, and would thus injure the business of nurserymen who grow camellias extensively.

FIELD LABORATORY, SPRING HILL, ALABAMA.

CERATOPHORUM SETOSUM KIRCHN. ON WHITE LUPINE IN LOUISIANA

W. J. Martin

Specimens of diseased plants of Lupinus albus obtained from the United States Department of Agriculture Soil Conservation Nursery near Minden, Louisiana, were sent in on May 24, 1948 by C. M. Moss. It was estimated that approximately 50 percent of the planting was affected. The diseased plants were found to be typical of that described under the name of Brown Spot in recent issues of the Plant Disease Reporter (PDR 32: 133. April 15, 1948 and 32: 181-184. May 15, 1948). Examination of the specimens revealed the presence of conidia of Ceratophorum setosum on the pod and stem lesions. This is the first report of the occurrence of this disease in Louisiana

LOUISIANA STATE UNIVERSITY, BATON ROUGE, LOUISIANA

BRIEF NOTES ON PLANT DISEASES

BLACK ROT OF CABBAGE: OUTBREAK IN FLORIDA

A. H. Eddins

The worst epidemic of black rot, caused by Bacterium campestris (Pammel) E.F.S., ever recorded for northern Florida occurred in cabbage fields during the 1947-48 season. Presence of the disease in some fields was traced to use of affected plants which had been grown from diseased seed. In some fields almost 100 percent of the plants were affected with black rot at the last cutting, and a few fields were abandoned before cutting because of excessive head rot. A test also demonstrated that the disease may be carried over in the soil from one crop to the next, as 10 percent of disease-free cabbage plants developed black rot in the spring when set in soil which had produced a fall crop of cabbage showing 90 percent affected plants. The only cabbage fields free of black rot were those set with plants grown in non-infested soil from black-rot-free seed.

POTATO INVESTIGATIONS LABORATORY, HASTINGS, FLORIDA

REQUEST FOR INFORMATION ON OCCURRENCE OF CABBAGE BLACK ROT THIS YEAR: In the letter accompanying the note above, Dr. Eddins suggests that because of the apparent prevalence of the organism in cabbage seed, it would be desirable to obtain as much information as possible on the occurrence of the disease in other locations, especially in the South. In accordance with this suggestion, the Survey would appreciate reports from other pathologists on the incidence of black rot on cruciferous crops in their locations this year, with special reference to such topics as relation of occurrence to seed or plant transmission, soil contamination, damage caused, etc. Please send such reports to the Plant Disease Survey.

CONTROL OF PEACH POWDERY MILDEW IN PERU

G. Garcia Rada

In Peru we have the "powdery mildew" disease (on the peach) which is caused by the fungus Sphaerotheca pannosa persicae. This disease has done very serious damage and has resulted in the death of many trees. All the efforts which I have made to control it by employing sulfur dust, lime-sulfur solution and other materials have not given me very satisfactory results. Happily a few gallons of the fungicide Dithane D-14 (sodium ethylene bisdithiocarbamate) came into my possession and I tried it. The fungicide was used with zinc sulfate and lime according to directions. The preliminary results of the first year were very

promising. The disease was controlled to the extent of 80 percent on the tender shoots, the organs most susceptible to the fungus. In the plants left as checks, the shoots were strongly infected, presented a weak appearance, and sometimes provoked defoliation.

I have repeated the trial during the current year but unfortunately had almost no infection, something completely abnormal, since the disease appears every year starting with the month of December. I have sent some of this fungicide to other parts of the country but have not yet received any information from this.

I used the same fungicide in 1947, a strongly epidemic year, against the potato disease caused by Phytophthora infestans. The results were not very clear. CENTRO NACIONAL DE INVESTIGACION Y EXPERIMENTACION AGRICOLA DE LA MOLINA, LA MOLINA, LIMA, PERU

ABSENCE OF OVULINIA AZALEAE SCLEROTINIA ON BLIGHTED AZALEA FLOWERS

A. G. Plakidas

To date (May 17) not a single sclerotium has been observed on blighted azalea flowers, either on the ground or on those still hanging on the bushes, in the Baton Rouge area. No observations were made in other parts of Louisiana. This is in contrast to what occurred last year when every blighted flower, on the bush or on the ground, had from one to several sclerotia on it. Flower blight was general but moderate this year. Azalea blooming was late this year (at least three weeks late). Warm and dry weather prevailed immediately following the azalea blooming period and this was probably unfavorable to the normal development of the fungus.

It will be of interest to note what effect the failure of sclerotial development will have on the incidence of the disease next year. LOUISIANA STATE UNIVERSITY, BATON ROUGE, LOUISIANA

OUTBREAK OF WHEAT COVERED SMUT, AND OTHER UNUSUAL DEVELOPMENTS OF CEREAL DISEASES IN OKLAHOMA

K. Starr Chester

The 1948 wheat crop in Oklahoma is showing an unusual amount of covered smut [Tilletia spp.]. Reports like the following are being received. A 160-acre field in Custer County, with a prospective yield of twenty-five bushels to the acre, was found to be 80 percent infested with smut

and was plowed up. Another large field in Harper County also showed 80 percent smut by count. Fields in Grant County were infested to the extent of 20 to 35 percent. County Agent, J. B. Hurst of Garfield County, center of Oklahoma wheat production, writes "Reports come to us from all parts of the county that in many fields combines raise a continuous black fog of smut spores." Most of the fields reported smutty have been of the varieties Red Chief and Early Triumph although the field in Harper County was Early Blackhull wheat.

This is by far the heaviest outbreak in a decade and, indeed, is considered the heaviest in the memory of many older wheat growers. During the past decade, the number of carloads of Oklahoma wheat docked for smut has steadily decreased to an insignificant low level. There are evidently two reasons for the 1948 outbreak. As has been many times noted with potato late blight and other diseases, after a series of relatively disease-free years, growers get careless about using control practices. In this case, there has been little reason for extension activities aimed at increasing wheat seed treatment, and much of the wheat that was planted last year was evidently not treated because of this laxity on the part of growers.

In the second place, the weather conditions of last fall were ideal for development of a smutty crop. There was a long drought from August into November and most of the wheat in this State was either not planted until late November or December when the soil was cool enough to encourage smut infection or, if the wheat was planted earlier, "in the dust", it did not germinate until late in the fall.

1948 has also been marked by other unusual features in cereal pathology. As predicted April 1, this has turned out to be a year of the lightest leaf rust [Puccinia rubigo-vera var. tritici] of wheat for at least a decade and possibly much longer. In contrast, there appears to be more stem rust [P. graminis] on wheat than for many years past although the attack has been so late that little damage will result. Crown rust [P. coronata] of oats, which is usually very common, was so exceedingly scarce this year that it has been impossible to make rust readings of nursery plots. Stem rust of oats, on the other hand, has been quite plentiful although usually not very damaging. Victoria blight [Helminthosporium victoriae] of oats has become widespread in Oklahoma following a trace last year. Many widely scattered fields of Neosho and Traveller oats showed light infestation with Victoria blight and occasional fields were heavily damaged. Identification of this disease was usually hampered by prevalent symptoms of drought injury. Barley was more heavily attacked by Septoria passerini than at any past time in the memory of many cerealists. Barley leaf rust [P. hordei] has been almost totally absent, but barley stem rust has developed to an unusual extent. These atypical developments evidently relate not only to the delayed seeding and emergence of fall planted grains but also to a long, cool spring with a late spring drought.

OKLAHOMA AGRICULTURAL AND MECHANICAL COLLEGE, STILLWATER. June 21.

CHECK LIST REVISION

Freeman Weiss

MADIA (COMPOSITAE)

MADIA ELEGANS D. Don, COMMON TARWEED (1); M. SATIVA Mol., CHILE T. (2); other spp. (3). Annual (1,2) and some perennial herbs, mostly in the Pacific Coast States; several useful to wildlife.

Coleosporium madiae Cke. (II,III), rust. Calif., Ore., Wash. (1,2,3). O and I on Pinus radiata
Entyloma madiae Cif., white smut. N.Dak. (3)
Erysiphe cichoracearum DC., powdery mildew. Calif. (1,3); Mont., N.Mex. (3)
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Calif. (2)
Puccinia nuda Ell. & Ev. (II,III), rust. Ore. (1,3); Wash. (2)
Sphaerotheca humilis (DC.) Burr., powdery mildew. Calif. (2)

Yellows -- virus (Chlorogenus callistephi var. californicus Holmes, Callistephus virus 1A K.M.Sm.). Calif. (1)

SCORZONERA (COMPOSITAE)

SCORZONERA HISPANICA L., BLACK SALSIFY. Perennial herb of Europe, cult. as a root vegetable.

Albugo tragopogonis Pers. ex S.F.Gray, white rust. Calif.
Heterodera marioni (Cornu) Goodey, root knot. ?Fla.

Yellows -- virus (Chlorogenus callistephi var. californicus Holmes, Callistephus virus 1A K.M.Sm.). Calif.

SENECIO (COMPOSITAE)

SENECIO spp. (cultivated). Mostly exotic perennial herbs, and some vines and shrubs, grown for ornament, usually under glass or in the open only in warm regions: S. CINERARIA DC., DUSTY MILLER (1); S. CRUENTUS (Mass.) DC. (including hybrid derivatives), FLORISTS' CINERARIA (2); S. PETASITIS DC., VELVET GROUNDSEL (3); S. SCANDENS Buch.-Ham., CLIMBING G. (4).

Botrytis cinerea Pers. ex Fr., leaf spot, blight. Ind., Mo., N.J., Pa., Alaska.

SENECIO cont.

Erysiphe cichoracearum DC., powdery mildew. Mass. (2)
Fusarium sp., stem rot. Pa. (2)
Heterodera marioni (Cornu) Goodey, root knot. (1), Md. (2)
Phytophthora sp., stem rot. N.J. (2)
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. N.Y. (2)
Pythium sp., root rot. Md. (2). P. ultimum Trow, Calif. (2)
Rhizoctonia solani Kuehn, damping off. Ill., N.J. (2)
Sclerotinia sclerotiorum (Lib.) DBy., stem rot. Wash. (2)
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Mass. (2)
Verticillium albo-atrum Reinke & Berth., wilt. N.J., N.Y., Wash. (2)

Mosaic -- unidentified virus. Wash. (2)
Spotted wilt, streak -- virus (Lethum australiense Holmes, Lycopersicon virus 3 K.M.Sm.) Calif., Tex., Wash. (2)
Yellows -- virus (Chlorogenus callistephi Holmes, Callistephus virus 1A K.M.Sm.). N.Y. (2)

SENECIO spp. (native or naturalized), GROUNDSEL, RAGWORT. Many perennial and some annual herbs widely distributed in the U.S.; some may be grown in wild gardens, some are useful to wildlife; a few are weeds in cultivated ground. The following are typical: S. AUREUS L. (1), S. INTEGERRIMUS Nutt. (2), S. TRIANGULARIS Hook. (3), S. VULGARIS L. (4), other spp. (5)

Albugo tragopogonis Pers. ex S.F.Gray, white rust. Ind., Wis. (1); Mo., Mont. (1,5); Nev. (2); Calif., Colo., Tex., Utah, Wash. (5)
Aphelenchoides fragariae (Ritz.-Bos) Christie, leaf nematode. (5)
Baeodromus californicus Arth. (III) rust. Calif. (5)
Cercospora senecionicola J.J.Davis, leaf spot. Wis. (1)
C. senecionis Ell. & Ev. Tex. (5)
Coleosporium occidentale Arth. (II,III), rust. Ida., Mont., Ore., Wash. (3); Calif., Colo., Mont., Utah, Wash., Wyo. (5). O and I unknown.
C. senecionis (Pers.) Fr. (II,III). Colo., R.I. (4). O and I on Pinus sylvestris in Europe.
Entyloma compositarum Farl., white smut. Md., Nebr., Pa., Wis. (E. wisconsiniense Cif.) (1); Kans., Pa., Tex. (5)
Erysiphe cichoracearum DC., powdery mildew. Minn., Va. (1) Ida., Nebr., Wash. (5)
Fusarium sp., wilt. N.J. (5)
Gloeosporium senecionis Ell. & Ev., leaf spot. Calif. (5)
Heterodera marioni (Cornu) Goodey, root knot. Hawaii (5)
Phyllosticta garrettii Syd., leaf spot. Ore., Wyo., Alaska (3); Utah, Wyo. (5). Phyllosticta sp., N.J. (5)
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (5)
Phytophthora sp., stem rot. N.J. (5)
Puccinia angustata Pk. var. eriophori (Thuem.) Arth. (O,I), rust. Conn. to Iowa and Minn. (1); N.H., Ore., Utah, Vt. (5). II and III on Eriophorum and Scirpus.

SENECIO cont.

P. recedens (III). Conn. to Va., Tenn., Iowa, and Wis. (1); also N.Car., and N.Dak. to Ore. and Wash. (5)

P. extensicola Plowr. var. hieraciata (Schw.) Arth. (0,I). Nebr. (2); N.Mex., ?Tex. (5). II and III on Carex spp.

P. stipae Arth. (0,I). Colo., Wyo. (2,5); Nebr. (5). II and III on Stipa and other grasses.

P. subcircinata Ell. & Ev. (0,I,III). Nebr., Nev., N. Dak. (2); Ida., Utah, Wash. (3); N.Dak. to N.Mex., Calif., and Wash. (5).

P. expansa Lk. (III). Calif., Utah, Wash., Wyo. (5)

Ramularia filaris Fres., leaf spot. Colo., Mont. (5)

R. pruinosa Speg., Colo. (5), Wyo (3,5).

R. senecionis (Berk. & Br.) Sacc. Calif., Colo. (5). Var. carniolicola Jaap, Calif. (5)

Rhizoctonia solani Kuehn, root rot. Ill., N.J. (5)

Sclerotinia sclerotiorum (Lib.) DBy., stem rot. La. (5)

Septoria cacaliae Ell. & Kell., leaf spot. Ala., Ind., Tex. (5)

S. senecionis West., leaf spot. Calif. (5)

S. senecionis-aurei J.J.Davis, Wis. (1,5)

Sphaerotheca humuli (DC.) Burr., powdery mildew. Wyo. (3), Calif. (5) var. fuliginea (Schlecht.) Salm. Calif., Colo., Mont., Wyo. (3); Utah (5)

Synchytrium aureum Schroet., leaf gall. Wis. (1)

Verticillium albo-atrum Reinke & Berth., wilt. Wash. (5)

Yellows -- virus (Chlorogenus callistephi var. californicus Holmes, Callistephus virus 1A K.M.Sm.). Calif. (4)

SERICOCARPUS (COMPOSITAE)

SERICOCARPUS ASTEROIDES (L.) B.S.P., WHITE-TOPPED ASTER (1); other spp. (2). Perennial herbs of the Eastern and Southern States, sometimes grown in wild gardens.

Coleosporium solidaginis (Schw.) Thuem. (II,III), rust. Conn. (1). 0 and I on 2- and 3-needle Pinus spp.

Diaporthe linearis (Nees) Nits., on stems. Ga. (1)

Mycosphaerella sp., on stems. Ga. (1)

Puccinia extensicola Plowr. var. solidaginis (Schw.) Arth. (0,I), rust. Tenn. (1); Ind., N.Car. (2)

Pyrenopeziza sp., on stems. Ga. (1)

SILPHIUM (COMPOSITAE)

SILPHIUM spp., especially S. LACINIATUM L., COMPASS PLANT (1); S. PERFOLIATUM L., INDIAN-CUP (2); S. TEREBINTHINACEUM Jacq. (3); other spp. (4). Tall perennial herbs of prairies and open woodlands in the Central States, east and southward; sometimes grown in wild gardens, especially (1) and (2).

Ascochyta compositarum J.J.Davis, leaf spot. Wis. (2)
A. treleasei Berk. & Vogl., on leaves. Wis. (4)
Cercospora silphii Ell. & Ev., leaf spot. Ill. (1,2); Wis. (1,3); Ala., Kans., W.Va. (4).
Var. laciniati Tehon & Daniels, Ill. (1)
Coleosporium terebinthinaceae (Schw.) Arth. (II,III). rust. Common on the spp. named and others within their range from Pa. to Ala., Tex., and Kans. O and I on 2-needle Pinus spp.
Colletotrichum silphii J.J.Davis, leaf spot. Wis. (2,4)
Diaporthe arctii (Lasch) Nits., on stems. Ga. (4)
Ellisiella mutica Wint., on leaves. Mo. (4)
Entyloma compositarum Farl., white smut. Wis. (4)
Erysiphe cichoracearum DC., powdery mildew. Conn. (3), Md. (4)
Leptosphaeria coniothyrium (Fckl.) Sacc., on stems. Ga. (4)
Mycosphaerella sp., on leaves. Wis. (2)
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Ill., Iowa (1); Wis. to Ark., Kans., and Minn. (2); Ill., Wis. (3); also Kans., Nebr., W.Va., Wis. (4)
Puccinia silphii Schw. (III), rust. On the spp. named, and others, within their range from N.Car. to Ala., Tex., and N.Dak.
Rhizoctonia solani Kuehn, root rot. Me. (4)
Sclerotium deciduum J.J.Davis, on leaves. Wis. (3)
Septoria alba Ell. & Barth., leaf spot. Ill., Kans. (4)
S. silphii Ell. & Ev. Iowa, Wis. (2); Wis. (4)
Uromyces silphii [Burr.] Arth. (O,I), rust. Ohio to Mo., Kans., and Wis. (1,2,3,4). II and III on Juncus spp. The name U. junci-tenuis Syd. is preferred by some authors.

SOLIDAGO (COMPOSITAE)

SOLIDAGO spp., GOLDENROD. Numerous perennial herbs widely distributed throughout the U.S.; many used in wild gardens, sometimes becoming weeds; some are potential sources of rubber, several are important honey plants. S. ALTISSIMA L. (1), S. BICOLOR L. (2), S. CAESIA L. (3), S. CANADENSIS L. (4), S. GRAMINIFOLIA (L.) Salisb. (5), and S. RUGOSA Mill. (6) are typical; other spp. (7).

Ascochyta compositarum J.J.Davis, leaf spot. Wis. (1)
Asteroma solidaginis Cke., black scurf on leaves. Iowa (4)
? Asteromella astericola J.J.Davis, on leaves. Wis. (1,7). See Sclerotium mendax.

SOLIDAGO cont.

Basidiophora entospora Roze & Cornu, downy mildew. Ill., Wis. (7)

? Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., stem canker. Iowa. (7)

Cercospora parvimaculans J.J.Davis, leaf spot. Wis. (7). May be identical with the following.

C. stomatica Ell. & J.J.Davis. Iowa, Wis. (7)

C. virgaureae Thuem. (Cercosporella v. (Thuem.) Allesch.), leaf spot. N.J. to Ala., Kans., & Wis. (1,2,4,7); ? Mont. (7). Cercosporella dearnesii Bub. & Sacc., reported in Wis., C. nivea Ell. & Barth. in Kans., Nebr., and Wis., and C. reticulata Pk. in N.Y., are doubtfully distinct and have been treated as synonyms by some authors.

Cladosporium astericola J.J.Davis, leaf mold. Wis. (1,7)

Coleosporium delicatulum [Arth. & Kern.] Hedgc. & Long (II,III), rust. Me. to Va. and Kans. (5); on other spp., sometimes referred to Euthamia, extending to Fla. and Tex. O and I on 2- and 3-needle Pinus spp.

C. solidaginis (Schw.) Thuem. (II,III), rust. General on 1,2,3,4,6 and many other spp. throughout their range in the U.S. O and I on 2- and 3-needle Pinus spp.

Colletotrichum solitarium Ell. & Barth., leaf spot. Nebr., Wis. (1); Kans., and Wis. (7)

Cuscuta spp., dodder. Occasional on many spp. throughout the Eastern and Central States and southward. C. gronovii Willd., C. indecora Choisy, and C. glomerata Choisy are particularly mentioned on Solidago.

Diaporthe linearis (Nees) Nits., on old stems. Ga., Mich., N.J., N.Dak. (On various spp., probably saprophytic).

Elsinoë solidaginis Jenkins, spot anthracnose. Fla., Ga. (1,2,3,4, 6,7); S.Car. (1,7)

Erysiphe cichoracearum DC., powdery mildew. General on the spp. named, except (5), and on others, throughout their range in the U.S.

Gibberidea heliopsidis (Schw.) Shear, black knot. Conn., Mo., N.Y., N.Dak. (7)

Leptothyrium similisporum Ell. & J.J.Davis (? L tumidulum Sacc.), on leaves and stems. Ill., N.Y., Wis. (7)

Macrophoma gallicola Sacc., on blister-galls. N.Dak. (7)

M. sphaeropsispora (Ell. & Ev.) Tassi, leaf spot. Calif. (7)

Mycosphaerella sp. (Sphaerella solidaginea Ell. & Kell.), on leaves. Kans. (4); ? Ga. (3,7); ? Fla. (7)

Pellicularia koleroga (Cke.) Rogers, thread blight. La. (7)

Phoma solidaginis Cke. var. longispora Sacc., on stems. N.Y. (7)

Phyllachora solidaginis (Schw.) Sacc. Name erroneously applied to a blister-gall caused by insects (Asteromyia spp.); other fungi but not Phyllachora may be present but are probably incidental. Commonly on (5), also (3), (6) and others.

SOLIDAGO cont.

? Phyllactinia corylea Pers. ex Karst., powdery mildew. Wash. (7)

Phyllosticta gallicola Ell. & Ev., on blister-galls. Colo. (7). See also Macrophoma, Phyllachora and Rhytisma.

P. solidaginicola Tehon & Daniels, leaf spot. Ill., Wis. (7)

P. solidaginis Bres. Wyo. (4), Wis. (7)

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,7)

Physalospora obtusa (Schw.) Cke., on stems. Ga. (7)

Placosphaeria haydeni (Berk. & Curt.) Petr. (Ophiodothis h. Sacc., Phyllachora h. Dearn.), black spot on stems and leaves. Iowa (4)

Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Ill., Wis. (7).

Pratylenchus pratensis (DeMan) Filip., root nematode. Fla. (1,6,7)

Puccinia extensicola Plowr. var. euthamii Arth. (0,I), rust. Me. to Va. and Wis. (5); also on related spp. that are sometimes referred to Euthamia, in this range and west to Oregon.

P. extensicola var. solidaginis (Schw.) Arth. (0,I), rust. General on 1,2,3,4,6 and many other spp. throughout their range in the U.S. II and III on Carex spp.

P. virgaureae (DC.) Lib. (III). Ill. (1), N.H. (6); Mass., Mich., N.Y. (7)

P. stipae Arth. (0,I). Colo., Mont., Nebr., N.Mex., N.&S.Dak. (7). II and III on Stipa, Koehleria, and Oryzopsis.

P. grindeliae Pk. (III). Ill. and Wis. to Calif., and Wash. (7)

Pyrenopeziza artemisiae var. solidagnis Rehm, on dead stems. N.Y. (7)

Ramularia minax J.J.Davis, on leaves. Wis. (7)

R. serotina Ell. & Ev., leaf spot. Colo., Ill., Wis., Wyo. (R. virgaureae Thuem.): Cercospora v.

Rhabdospora solidaginis (Cke. & Ell.) Sacc., on stems. Colo., Ind. (4); N.J. (7)

R. subgrisea Pk., on stems and galls. Mich., N.Y. (7)

Rhodochytrium spilanthidis Lagh., leaf gall. La. (7)

Rhytisma solidaginis Schw. Name erroneously applied to blister-galls caused by insects (Asteromyia spp.), commonly on (5) and other spp. referred to Euthamia.

Sclerotium mendax Sacc., on leaves. N.Y. (1); Wis. (1,4,7). Associated with Asteromella astericola but connection not confirmed.

Septoria spp., leaf spot. Numerous questionable spp. reported, those considered synonyms by some authors are indicated below.

S. atropurpurea Pk. Ill., Wis. (7)

S. brevis Pk. N.Y. (7)

S. davisii Sacc. Wis. (4,7); Colo., Fla. (7)

S. fumosa Pk. (S. angularis Dearn. & Barth., ? S. davisii) Wis. (1,5,7); N.Y. (4,7); Ill., Iowa, Mo. (7)

S. solidaginicola Pk. (? S. intermedia Ell. & Ev.) Wis. (1,3,4,7); S.Dak. (3); Kans., N.Y. (7)

S. solidaginis Thuem. Iowa (3), S.Car. (7)

S. virgaureae Desm. (? S. dolichospora Ell. & Ev.) Iowa (4,7); Ala., Mich., Mo., S.Car. (7)

SOLIDAGO cont.

Sphaerotheca humuli (DC.) Burr. var. fuliginea (Schlecht.) Salm., powdery mildew. Ind. (7)
Thecaphora cuneata (Schofield) Clint., inflorescence smut. Kans. (7)
? Uncinula sp., powdery mildew. N.Y. (7)
Uromyces perigynius Halst. (0,I), Me. (6). II and III on Carex spp.
U. solidaginis (Sommerf.) Niessl (III). Colo., Ida., Mont., Ore., Wash., Wyo. (7)

Mosaic -- unidentified virus. N.Y. (7)

SONCHUS (COMPOSITAE)

SONCHUS ARVENSIS L. (1), S. ASPER (L.) Hill (2), and OLERACEUS L. (3), SOW-THISTLE. Coarse perennial (1) or annual (2,3) herbs of Europe, widely naturalized in the U.S.; important agricultural weeds, especially in the spring wheat belt, but useful to wildlife; (3) is sometimes used for greens.

Alternaria sonchi J.J.Davis, leaf spot. Mass. (1); La., N.Y., Tex., Wis. (2); Fla., Tex. (3)
Bremia lactucae Regel, downy mildew. Md. (1); N.Y., Ore., (2); Fla.; N.Y., S.Car., Tex. (3)
Coleosporium sonchi-arvensis (Pers.) Lév. (II,III), rust. Wash. (1); Wis. (2). O and I on Pinus sylvestris.
Diaporthe arctii (Lasch) Nits., on stems. Ga. (3)
Erysiphe cichoracearum DC., powdery mildew. Fla., Pa. (3)
? Phyllosticta sonchi Sacc., leaf spot. N.Dak. (1)
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,3)
Sclerotinia sclerotiorum (Lib.) DBy., stem rot. Fla. (3).
Septoria sonchifolia Cke., leaf spot. Wash. (1); Me., S.Car., Wis. (2); Ill., ? Ala. (3)
Sphaerotheca humuli (DC.) Burr., var. fuliginea (Schlecht.) Salm., powdery mildew. Iowa, Pa. (3)

Yellows -- virus (Chlorogenus callistephi Holmes, Callistephus virus 1 K.M.Sm.). N.Y. (1,2); Tex. (2). Also var. californicus Holmes, in Calif. (2,3)

STEPHANOMERIA (COMPOSITAE)

STEPHANOMERIA CICHORIACEA A.Gray, WIRE-LETTUCE (1). Perennial herb of California, sometimes grown for ornament. Other spp. (2)

Cercospora clavicarpa Ell. & Ev., leaf spot. Calif. (2)
Puccinia harknessii Vize (0,I,III), rust. Mont. to N.Mex., Calif., and Wash. (2). Var. major Arth. (0,I,III). Calif. (1,2)

STEVIA (COMPOSITAE). - For florists' "Stevia" see Piqueria trinervia

STOKESIA (COMPOSITAE)

STOKESIA LAEVIS (Hill) Greene, STOKES-ASTER. Perennial herb of the Southeastern and Gulf States, grown as a garden flower.

Ascochyta sp., leaf spot. Iowa, Pa.
Botrytis cinerea Pers. ex Fr., head blight. N. Y.

Mosaic -- unidentified virus. Iowa

TAGETES (COMPOSITAE)

TAGETES ERECTA L., AZTEC (AFRICAN) MARIGOLD (1); T. PATULA L., FRENCH M. (2); other spp. and hybrids (3). Annual herbs of Mexico, widely cult. for ornament.

Alternaria sp., leaf spot (? secondary). N. J. (3)
Aphelenchoides tagetae Steiner, root nematode. Md. (3)
Botrytis cinerea Pers. ex Fr., head blight. Conn., N. J., Pa., Alaska (1,2,3)
Cercospora sp., leaf spot. Conn. (3). C. tageticola Ell. & Ev. Fla. (2)
Coleosporium madiae Cke. (II,III), rust. Calif. (1). O and I on Pinus radiata.
Fusarium sp. (? F. oxysporum Schlecht. f. conglutinans (Wr.) Snyder & Hansen), wilt, stem rot. Calif. (1); N. J., N. Y. (1,2)
Helminthosporium sp., flower spot. Tex. (1)
Heterodera marioni (Cornu) Goodey, root knot.
Macrophomina phaseoli (Maub.) Ashby, charcoal rot. Okla. (3)
Phytophthora cryptogea Pethyb. & Laff., stem rot, wilt. N. Y. (3)
Pseudomonas solanacearum E.F.Sm., bacterial wilt. Fla. (1)
Puccinia tageticola Diet. & Holw. (II,III), rust. P. R. (1,2); Tex. (3)
Pythium ultimum Trow, root rot. Calif. (2)
Rhizoctonia solani Kuehn, root and stem rot. Tex. (1,2)
Sclerotinia sclerotiorum (Lib.) DBy., stem rot, wilt. N. Y. (3)
Sclerotium rolfsii Sacc., southern blight. Fla., N. J., Va. (3)
? Verticillium albo-atrum Reinke & Berth., wilt. N. Y. (3)

Mosaic -- virus (Marmor cucumeris Holmes, Cucumis virus 1 K.M.Sm.). Fla. (1,2)
Yellows -- virus (Chlorogenus callistephi Holmes, Callistephus virus 1 K.M.Sm.). Conn., N. J., N. Y., Pa., Wis. (1,2). Also var. californicus Holmes in Calif. (1,2)

TANACETUM (COMPOSITAE)

TANACETUM VULGARE L., TANSY (1). European perennial grown in old gardens for ornament and pharmaceutical use, and occasionally escaped. T. CAPITATUM (Nutt.) T. & G. (2), endemic in the northern Rocky Mts., may also be cultivated.

Erysiphe cichoracearum DC., powdery mildew. Pa. (1)
Heterodera marioni (Cornu) Goodey, root knot. ? Fla. (1)
Puccinia absinthii (Hedw. f.) DC. (0,I,II,III), rust. Wyo. (2)
Ramularia tanaceti Lind, leaf spot. Wis. (1)

TARAXACUM (COMPOSITAE)

TARAXACUM OFFICINALE Weber, COMMON DANDELION. European perennial, widely naturalized and a frequent weed; a minor honey plant; selected forms are grown for greens and pharmaceutical use. T. KOK-SAGHYZ Rodin, RUSSIAN D. (2), has been grown as a source of rubber. Other spp. (3)

Ascochyta taraxaci Grove, leaf spot. Alaska (3)
Botrytis cinerea Pers. ex Fr., gray-mold blight. N.Y. (1)
Ditylenchus dipsaci (Kuehn) Filip., stem and leaf nematode. Mass., N.Y., Hawaii (1)
Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. Kans. (2)
Erysiphe cichoracearum DC., powdery mildew. Ind., Iowa, Nebr., N.J., N.Y., Ohio, Pa. (1)
Heterodera marioni (Cornu) Goodey, root knot. Tex. (1), Fla. (2)
? Phyllactinia corylea Pers. ex Karst., powdery mildew. Wash. (1)
Pratylenchus pratensis (DeMan) Filip., root nematode.
Protomyces pachydermus Thuem., leaf and stem gall. Utah. (1)
Pseudomonas tabacum (Wolf & Foster) Stapp, bacterial leaf spot. Wis. (1)
Puccinia hieracii (Schum.) Mart. (P. taraxaci (Reb.) Plowr.) (0,I, II,III), rust. General (1). Also on native spp., mostly western.
Ramularia sp., leaf spot. Conn. (2)
R. lineola Pk., leaf spot. Ind., N.Y., N.Car., N.Dak. (1). Doubtfully distinct from the following.
R. taraxaci Karst., leaf spot. Eastern and Central States to Colo. and Wash. (1); Iowa, Mich., Wash., Alaska (3)
Rhizoctonia solani Kuehn, root rot. Conn. (1,2), N.J. (1), Wash. (1,3)
Sclerotinia sclerotiorum (Lib.) DBy., crown rot. Pa. (1)
Septoria unicolor Wint., leaf spot. Wash. (1)
Sphaerotheca humuli (DC.) Burr. var. fuliginea (Schlecht.) Salm., powdery mildew. Mass., to N.J., Mo. and Wash. (1)

TARAXACUM cont.

Synchytrium taraxaci DBy. & Wor., leaf gall. Minn. (1)
Xanthomonas taraxaci Niederhauser, bacterial leaf spot. N.Y. (2)

Yellows -- virus (Chlorogenus callistephi Holmes, Callistephus virus 1 K.M.Sm.) Tex. (1)

TITHONIA (COMPOSITAE)

TITHOMIA ROTUNDIFOLIA (Mill.) Blake. Shrub of Mexico and Central America, grown for ornament under glass or in the open in the far South.

Heterodera marioni (Cornu) Goodey, root knot. Hawaii

Mosaic -- unidentified virus. P.R.

TRAGOPOGON (COMPOSITAE)

TRAGOPOGON PORRIFOLIUS L., SALSIFY. Biennial of s. Europe, widely grown in home gardens and truck crop centers in the North for its edible taproot.

Albugo tragopogonis Pers. ex S.F.Gray, white rust. General.
Cercospora tragopogonis Ell. & Ev., leaf spot. Mont., Okla.
Ditylenchus dipsaci (Kuehn) Filip., leaf and stem nematode. Calif.
Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. Conn.
Erysiphe cichoracearum DC., powdery mildew. General.
Heterodera marioni (Cornu) Goodey, root knot. N.Y. to Ala.; Wash.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Rhizoctonia solani Kuehn, root rot. Wash.
Sclerotinia intermedia Ramsey and S. sclerotiorum (Lib.) DBy., crown rot. Ill.
Sporodesmium scorzonerae Aderh., leaf blight. Ala., Md., N.Y., Pa., Va., W.Va.
Stemphylium botryosum Wallr. var. tragopogoni Linn, leaf spot. N.Y.
Verticillium albo-atrum Reinke & Berth., wilt. N.Y.

Curly top -- virus (Chlorogenus eutetticola Holmes, Beta virus 1 K.M.Sm.). Ore.
Yellows -- virus (Chlorogenus callistephi Holmes, Callistephus virus 1 K.M.Sm.). Md., N.Y., Pa., Wis. Also var. californicus Holmes in Calif.

TUSSILAGO (COMPOSITAE)

TUSSILAGO FARFARA L., COLTSFOOT. Perennial herb of Eurasia, naturalized in the Eastern and Central States, sometimes grown for ground cover.

Mycosphaerella tussilaginis (Rehm) Lindau (Ramularia brunnea Pk.), leaf spot. N.Y.
Septoria farfaricola Dearn., leaf spot. Tenn.

VERBESINA (COMPOSITAE)

VERBESINA spp., CROWNBEARD, as V. ENCELIOIDES (Cav.) Benth. & Hook. (1), V. OCCIDENTALIS (L.) Walt. (2), V. VIRGINICA L. (3), other spp. (4). Perennial herbs, except (1) annual, mostly in the Southeastern States to Tex.; sometimes grown for ornament.

Cercospora fulvella Heald & Wolf, leaf spot. Tex. (4)
Coleosporium viguierae Diet. & Holw. (II,III), rust. Ariz. (1); Fla. (3,4); N.Car. (3), Tex. (4). O and I unknown.
Colletotrichum sp., leaf and stem spot. Ariz. (1)
Erysiphe cichoracearum DC., powdery mildew. S.Car. (2), Va. (3)
Heterodera marioni (Cornu) Goodey, root knot. Ala. (2,3)
Laestadia verbesinae Pat. & Gail., on leaves. Canal Zone. (4)
Phyllosticta verbesinae Heald & Wolf, leaf spot. Tex. (4)
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1)
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. N.Mex., Tex. (1)
Puccinia abrupta Diet. & Holw. (II,III), rust. Tex. (1); Calif. (4). O and I unknown.
P. cognata Syd. (O,I,II,III). Ark., La., Tenn. (3); Tex. (1,3,4)
P. verbesinae Schw. (O,I,II,III). Md. to Ala., La. and Ind. (2)
Rhizoctonia crocorum (Pers. ex DC.) Fr., root rot. Tex. (3)
Stachybotryella repens Ell. & Barth., on leaves. Tex. (3)

VERNONIA (COMPOSITAE)

VERNONIA spp., IRONWEED. Tall perennials of the Eastern and Central States, and numerous southward, sometimes grown in wild gardens. V. ALTISSIMA Nutt. (1), V. FASCICULATA Michx. (2), and V. NOVEBORACENSIS (L.) Willd. (3) are typical; other spp. (4)

Ascochyta treleasei Berl. & Vogl., leaf spot. Wis. (3)
Cercospora noveboracensis Ell. & Ev., leaf spot. Mo. (3)
C. oculata Ell. & Kell. and C. vernoniae Ell. & Kell. (questionably distinct), leaf spot. Reported on the named spp. and others from W.Va. to Ala., La., Nebr. and Wis.

VERNONIA cont.

Coleosporium vernoniae Berk. & Curt. (II,III), rust. General (1,2,3), also on other spp. within their range from Mass. to Fla., Tex., and Nebr. 0 and I on 2- and 3-needle pines.

Erysiphe cichoracearum DC., powdery mildew. Reported on all spp. named, and others; probably general.

Mycosphaerella sp. (Sphaerella decidua Ell. & Kell.), leaf spot. Kans. (4)

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4)

Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Mo. (3); Kans. (4)

Puccinia arthuriana Jacks. (0,II,III), rust. P.R. (4)

P. insulana (Arth.) Jacks. (0,II,III). P.R., Virgin Is. (4)

P. rotundata Diet. (0,III). Canal Zone (4)

P. vernoniae Schw. (0,I,II,III). Occasional on all spp. named and others within their range from N.Y. to Miss., Tex. and N.Dak.

Septoria sp. (? S. vernoniae Syd.), leaf spot. Mo. (4)

Stigmella vernoniae Dearn. & Barth., black mildew. Mo. (4)

Sphaerotheca humuli (DC.) Burr. var. fuliginea (Schlecht.) Salm., powdery mildew. Mo. (3)

VIGUIERA (COMPOSITAE)

VIGUIERA ANNUA (M.E.Jones) Blake, GOLDEN-EYE. (1) Annual herb of dry plains in the Southwest, a minor forage plant, perhaps of ornamental value. Other spp. (2), some perennial, are useful to wildlife.

Entyloma compositarum Farl., white smut. Utah (2)

Erysiphe cichoracearum DC., powdery mildew. Utah (2)

Puccinia abrupta Diet. & Holw. (II,III), rust. Ariz. (1); Tex. (2)

P. turgidipes Jacks. (II,III). Ariz., Calif. (2)

Rhizoctonia crocorum (Pers. ex DC.) Fr., root rot. Tex. (2)

WYETHIA (COMPOSITAE)

WYETHIA spp., as W. AMPLEXICAULIS Nutt. (1), W. ANGUSTIFOLIA (DC.) Nutt. (2), other spp. (3). Perennial herbs of the Rocky Mountain and Southwestern States, some of ornamental value or useful to wildlife.

Didymaria conferta Syd., leaf spot. Utah, Wyo. (1); Ore. (2)

Marssonina wyethiae (Ell. & Ev.) Magn., leaf spot. Wash. (1); Calif. (3)

Puccinia balsamorhizae Pk. (0,I,II,III), rust. Ariz. (3); Calif. (2); Colo. (1,3); Utah (1,2,3)

Wyethia cont.
Septoria wyethiae Harkn., leaf spot. Calif., Utah (3)
Tylenchus balsamophilus Thorne, leaf gall. Utah (1)

XANTHIUM (COMPOSITAE)

XANTHIUM SACCHARATUM Wallr. (including X. americanum Walt., X. canadense Mill., X. commune Britton, X. orientale L., X. pennsylvanicum Wallr. in American manuals), COMMON COCKLEBUR (1). Cosmopolitan annual herb, often a troublesome weed, but useful to wildlife. X. SPINOSUM L., SPINY C. (2). Similar, but distribution more southern.

Albugo tragopogonis Pers. ex S.F.Gray, white rust. Ore. (1)
Aphelenchoides fragariae (Ritz-Bos) Christie, leaf nematode. (1)
Botrytis cinerea Pers. ex Fr., gray-mold leaf spot. W. Va. (1)
Cercospora xanthicola Heald & Wolf, leaf spot. Wis. (1)
Colletotrichum xanthii Halst., on stems. N.J. (1)
Cuscuta sp., dodder. Tex. (1)
Diaporthe arctii (Lasch) Nits., on stems. Ga. (1)
Diplodia natalensis Pole-Evans, on stems. Ala. (1)
Erysiphe cichoracearum DC., powdery mildew. N.J. to Fla., Tex., and Wis. (1)
Heterodera marioni (Cornu) Goodey, root knot. Hawaii (1)
Mycosphaerella xanthicola (Cke. & Harkn.) Lindau, on stems. Calif. (1)
Phymatotrichum omnivorum (Shear) Dug., root knot. Tex. (1)
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Iowa (1)
Puccinia canalicuta (Schw.) Lagerh. (O,I), rust. Occasional, Pa. to Ark., N.Mex., and Nebr. II and III on Cyperus spp.
P. xanthii Schw. (III). General (1); Ind., Mont. (2)
Rhabdospora xanthii Pk., on stems. N.Y. (1)
Septoria xanthii Desm., leaf spot. Calif., Del., N.Dak. (1)

ZINNIA (COMPOSITAE)

ZINNIA ELEGANS Jacq. (including Z. pumila Hort., not A. Gray), ZINNIA (1). Annual herb of Mexico, widely grown for ornament. Other spp. (2)

Alternaria zinniae Pape, Alternaria blight. Conn., N.J., N.Y., Pa., S.Car.
Aphelenchoides fragariae (Ritz.-Box) Christie
? A. olesistus (Ritz.-Bos) Steiner & Buhrer
A. ritzema-bosi (Schwartz) Goodey, Del., Mass.
Botrytis cinerea Pers. ex Fr., head blight, stem canker. Calif., Conn., N.J., Ore., Pa., Alaska (1)

ZINNIA cont.

Cercospora zinniae Ell. & Martin (C. atricincta Heald & Wolf), leaf spot. S.Car. to Fla. and Tex., also reported in Colo., Ind., Pa., P.R. and Guam (1); Ala., Fla. (2)

Choanephora sp., blossom rot. Fla., P.R. (1)

Erysiphe cichoracearum DC., powdery mildew. General (1)

Fusarium sp., stem rot, wilt (? secondary). Colo., Iowa, Mo., N.Y., Wash.(1)

Heterodera marioni (Cornu) Goodey, root knot. N.J., Pa., Tex. (1)

Macrophomina phaseoli (Maub.) Ashby, charcoal rot. Tex. (1)

Paratylenchus nanus Cobb, in roots. Md. (1)

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1)

Phytophthora cryptogea Pethyb. & Laff., stem rot, wilt. N.J. (1)

Pseudomonas solanacearum E.F.Sm., bacterial wilt. Fla. (1)

Rhizoctonia solani Kuehn, damping off, root rot. Calif., N.J., Tex. (1)

Sclerotinia sclerotiorum (Lib.) DBy., stem rot. Calif., Colo., Mass., Mont., Ore., Pa., Wash. (1)

Sclerotium rolfsii Sacc., southern blight. Fla., N.J. (1)

Curly top -- virus (Chlorogenus eutetticola Holmes, Beta virus 1 K.M.Sm.) Calif., Ida., Ore., Wash. (1)

Mosaic -- unidentified virus(es). Conn., Fla., Iowa, Kans., N.J., N.Y., Okla., Wash., Wis., Hawaii (1). Several strains of cucumber mosaic virus (Marmor cucumeris Holmes, Cucumis virus 1 K.M. Sm.) have been identified in naturally infected zinnias, and susceptibility to systemic infection by inoculation with the following viruses has been demonstrated: alfalfa mosaic, tobacco mosaic (green and yellow types), tobacco etch, tobacco ringspot, and turnip mosaic.

Spotted wilt -- virus (Lethum australiense Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Tex. (1)

Yellows -- virus (Chlorogenus callistephi Holmes, Callistephus virus 1 K.M.Sm.). Mich., Pa. Also var. californicus Holmes, Callistephus virus 1A K.M.Sm., in Calif.

CRASSULACEAE

BRYOPHYLLUM. See KALANCHOË

CRASSULA (CRASSULACEAE)

CRASSULA ARGENTEA L. (1). Fleshy-leaved shrub of S.Africa, grown as a pot plant under glass, or in the open in Calif. Other spp. (2), ranging from succulent herbs to shrubs of similar origin and use.

CRASSULA cont.

Armillaria mellea Vahl ex Fr., root rot. Calif. (1)
Diplodia crassulae Cke. & Harkn., on stems. Calif. (2)
Gloeosporium sp. (? Glomerella cingulata (Ston.) Spauld. & Schrenk), anthracnose. N.J. (2)
Phomopsis sp., leaf spot. Conn. (2)
Pythium sp., root rot. N.J., N.Y. (2)

ECHEVERIA (CRASSULACEAE)

ECHEVERIA spp. Rosette-like succulent herbs of s. California and Mexico, grown for ornament.

Heterodera marioni (Cornu) Goodey, root knot. Calif.
Puccinia echeveriae Linder (III), rust. Calif. On E. caespitosa (Haw.) DC. and E. farinosa Lindl.

KALANCHOE (CRASSULACEAE)

KALANCHOE spp., especially K. DAIGREMONTIANA Hamet. & Perrier (1); K. LACINIATA DC. (D. carnea Mast., K. coccinea Welw.) (2); and K. PINNATA Pers. (Bryophyllum calycinum Salisb.) (3). Succulent herbs and subshrubs of s. Asia and Africa, grown for novelty and ornament under glass, (2) becoming naturalized in s. Florida, and (3) widely in tropical America.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Widely used as experimental subject (1,3)
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on stems. Hawaii (3)
Diplodia natalensis Pole-Evans, on stems. Ala. (3)
Fusarium sp., stem rot, wilt (? secondary). N.J. (2)
Omphalia flavida Maub. & Rang., leaf spot. P.R. (3)
Phytophthora ? cactorum (Cohn & Leb.) Schroet., crown rot. N.J., N.Y. (2)
P. parasitica Dastur, leaf rot. P.R.
Sphaerotheca humuli (DC.) Burr. var. fuliginea (Schlecht.) Salm., powdery mildew. Md., N.J. (2)

SEDUM (CRASSULACEAE)

SEDUM spp., STONECROP. A. Cultivated spp., mostly native to Europe and Asia, grown as rock garden and house plants, sometimes locally naturalized and weedy, as S. ACRE L. (1), S. SPECTABILE Boreau (2), and S. TELEPHIUM L., including the var. PURPUREUM (Lk.) ? LIVE-FOREVER (3); other spp. (4)

SEDUM cont.

Cercospora sedi Ell. & Ev., on leaves. Ala. (4)
? Colletotrichum sp. (Vermicularia beneficiens Pk.), stem rot. Va. (1); N.Y. (3)
Heterodera marioni (Cornu) Goodey, root knot. (3,4)
Phytophthora sp., stem rot. N.Y. (3)
Pleospora sp., leaf spot. N.Y. (3)
Rhizoctonia solani Kuehn, stem rot. Ill., N.J. (2,4)
Sclerotium rolfsii Sacc., southern blight. Kans., N.J., Va. (1)
Septoria sedi West., leaf spot. Me., N.Y. (1); Ill., Iowa (2); N.Y., Vt., Wis. (3)
Sphaeronema minutulum D.Sacc., on stems. N.Y. (2)
Vermicularia: see Colletotrichum

SEDUM spp. B. Native to the U. S., mostly Mont. to Colo., and the Pacific Coast; some useful to wildlife, of ornamental value, or minor honey plants.

Diplodia sedicola Cke. & Harkn., on stems. Calif.
Puccinia rydbergii Garrett (III), rust. On S. debile Wats. and S. stenopetalum Pursh in Utah.
P. umbilici Guep. (III). On S. integrifolium in Colo. and Wyo.

SEMPERVIVUM (CRASSULACEAE)

SEMPERVIVUM TECTORUM L., HOUSE-LEEK (1), other spp. (2). Succulent herbs, mostly of Europe, grown as rock-garden and house plants.

Endophyllum sempervivi (Alb. & Schw.) DBy. (III), rust. Mass., N.J., N.Y. (1,2)
Phytophthora parasitica Dast., stem and leaf rot. N.Y. (2)
Pythium sp., root rot. Iowa (1)

DIAPENSIACEAE

GALAX

GALAX APHYLLA L. Evergreen herb of upland dry woods from Pa. to Ga. and Tenn.; extensively gathered for florists' greens, also grown for ground cover.

Clypeolella leemingii (Ell. & Ev.) Theiss., black leaf spot. Md. to Ga. and Tenn.
(Glenospora melioloides Curt.): Clypeolella leemingii
Laestadia galactina Dearn. & House, on leaves. N.Car. Also reported as Sphaerella sp. in Va., and perhaps preferably referred to Mycosphaerella.

GALAX cont.

Pezizella oenotherae (Cke. & Ell.) Sacc., leaf spot. N.Car., Tenn.
Phoma galactis Dearn. & House, on stems. N.Car. Probably a synonym of the following.
Phyllosticta galacis (Cke.) Ell. & Ev., leaf spot. N.Car., Va., W.Va. Published as galactis by Ellis and Everhart based on Cooke's Phoma galacis.
(Sclerotiopsis concava (Desm.) Shear & Dodge): Pezizella oenotherae

SHORTIA (DIAPENSIACEAE)

SHORTIA GALACIFOLIA Torr. & Gray, OCONEE-BELLS. Evergreen herb of highlands of N. & S.Car.; grown in rock gardens.

Pezizella oenotherae (Cke. & Ell.) Sacc., leaf spot. N.&S.Car.
Sclerotium sp., S.Car.

DIOSCOREACEAE

DIOSCOREA

DIOSCOREA spp., YAM, as D. ALATA L. (1); D. BATATAS Decne., CHINESE YAM, CINNAMON-VINE (2); D.VILLOSA L., WILD YAM (3); others (4). Tuberous-rooted, herbaceous or woody vines, frequent in the tropics; (2) cultivated and (3) endemic also in the Southern and Eastern States. Some are grown for edible roots (1,2 and others), some for ornament (2), some furnish food for wildlife.

Cercospora carbonacea Miles, leaf spot. P.R. (1,4)
C. dioscoreae Ell. & Martin. Md., Iowa, Mich., Pa., Wis. (3).
Colletotrichum sp. (? C. gloeosporioides Penz. = Glomerella cingulata (Ston.) Spauld. & Schrenk), anthracnose P.R. (4)
C. dioscoreae Tehon, leaf spot. Ill. (3)
Didymaria fulva Ell. & Ev., on leaves. Ind. (3)
Didymella dioscoreae (Berk. & Curt.) Sacc., on stems. S.Car. (4)
Diplodia theobromae (Pat.) Nowell (= Physalospora rhodina (Berk. & Curt.) Cke.), root rot. Canal Zone (1)
Fusarium sp., wilt. P.R. (4)
Gloeosporium sp., anthracnose. See Colletotrichum
Goplana dioscoreae (Berk. & Br.) Cumm. (II,III), rust. Guam (1)
Heterodera marioni (Cornu) Goodey, root knot. N.Car. (4)
Phyllachora ulei Wint., black leaf spot. Canal Zone, P.R. (4)
Phyllosticta dioscoreae Cke., leaf spot. S.Car., Va., W.Va. (3)
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

DIOSCOREA cont.
Pratylenchus pratensis (DeMan) Filip., root nematode. P.R.
Rotylenchus bradys (Steiner & LeHew) Filip., P.R. (1,2,4)
Ramularia dioscoreae Ell. & Ev., leaf spot. Wis.
Sphenospora pallida (Wint.) Diet. (II), rust. Canal Zone (4)
Uredo dioscoreicola Kern, Cif. & Thurston (II), rust. P.R. (4)

Mosaic -- unidentified virus. P.R.

RAJANIA (DIOSCOREACEAE)

RAJANIA CORDATA L., COCKSCOMB YAM. Perennial vine of the West Indies, grown for ornament.

Phyllachora ulei Wint., black leaf spot. P.R.
Uredo dioscoreicola Kern, Cif. & Thurston (II), rust. P.R.

DIPSACEAE

DIPSACUS (DIPSACEAE)

DIPSACUS FULLONUM L., FULLERS TEASEL (1); D. SYLVESTRIS Mill., COMMON T. (2). Biennial herbs of Europe, grown for ornament (2) or for burs for fulling wool (1); escaped or locally naturalized in the Eastern States and Pacific Northwest.

Cercospora elongata Pk., leaf spot. Md. (1); N.Y. to Mo. and Ill.; Wash. (2).
Ditylenchus dipsaci (Kuehn) Filip., stem & leaf nematode. Calif., Ore. (2)
Mycosphaerella asterinoides (Ell. & Ev.) Fairm., on stems. N.Y. (2)
Peronospora dipsaci Tul., downy mildew. Mo. (2)
? Phyllactinia corylea Pers. ex Karst., powdery mildew. Wash. (2)

SCABIOSA (DIPSACEAE)

SCABIOSA ATROPURPUREA L., SWEET SCABIOUS (1); other spp. (2). Annual or perennial herbs of Europe or Asia, especially (1) grown as a garden flower.

Erysiphe polygoni DC., powdery mildew.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Sclerotinia sclerotiorum (Lib.) DBy., stem rot. N.Y. (2)

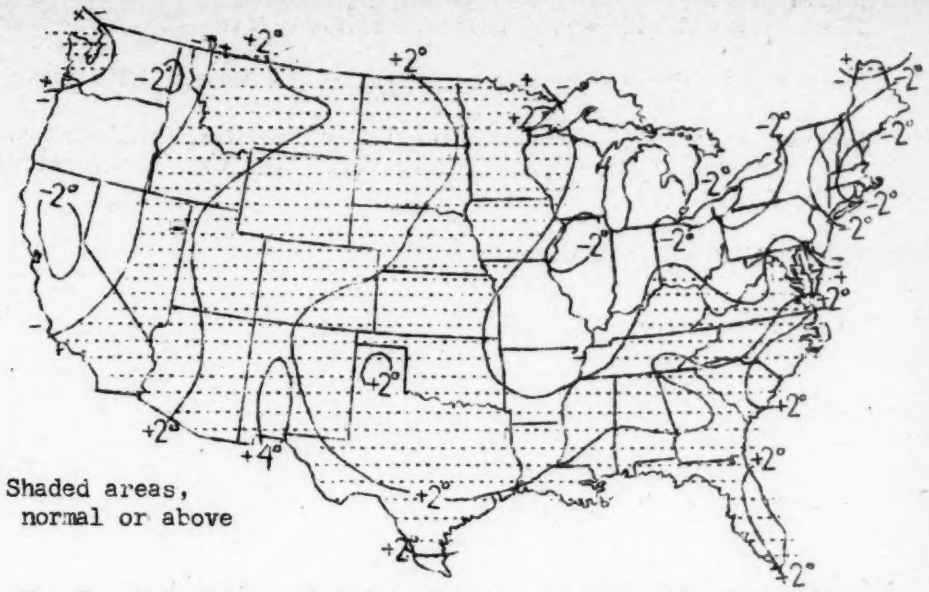
SCABIOSA cont.

Sclerotium rolfsii Sacc., southern blight. Fla. (1)

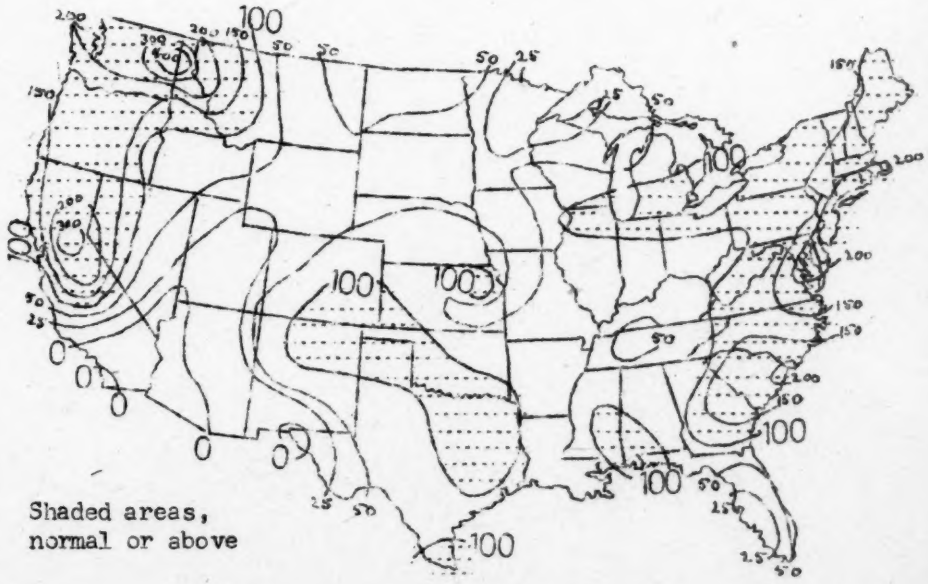
Curly top -- virus (Chlorogenus eutetticola Holmes, Beta virus 1 K.M. Sm.). Calif. (1)

Yellows -- virus (Chlorogenus callistephi Holmes, Callistephus virus 1 K.M.Sm.). Conn., N.J., N.Y., Va. Also var. californicus Holmes in Calif. (1)

DIVISION OF MYCOLOGY AND DISEASE SURVEY



Map I. Departure of mean temperature from normal, May, 1948



Map II. Percentage of normal precipitation, May, 1948

MAY WEATHER

From U. S. Department of Commerce, Weather Bureau, Weekly Weather and Crop Bulletin for week ending June 8, 1948.

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